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AMERICAN Gas Journal

NOVEMBER, 1957

Only Magazine Published Exclusively for the Gas Utility Industry

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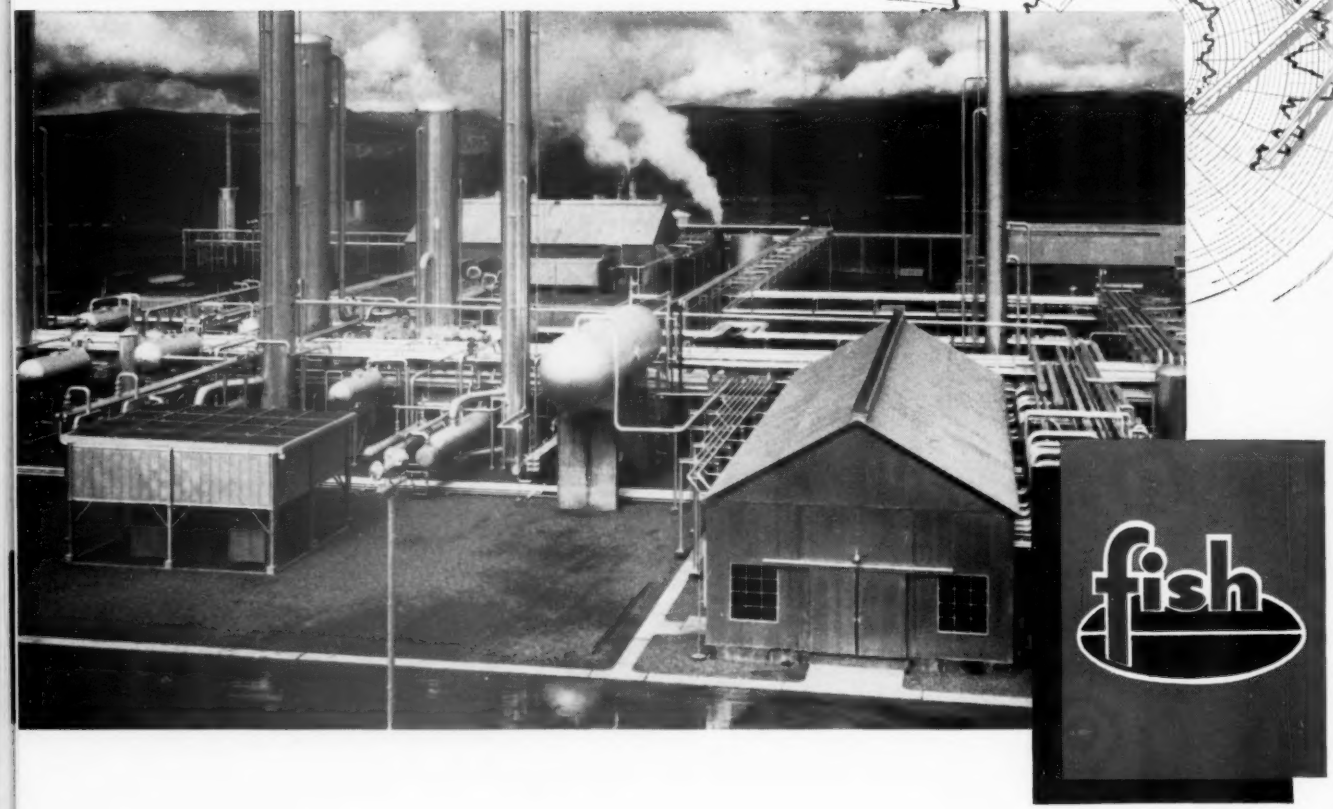

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AMERICAN Gas Journal

GAS TECHNOLOGY — OPERATIONS — EQUIPMENT — MANAGEMENT — UTILIZATION

VOLUME 184 — November, 1957 — Number 12

CONTENTS

OPERATIONS & MANAGEMENT

The Law: *Blasting Damage Liability Varies Among States* 11
Leo T. Parker

Natural Gas Comes to Watertown 12
D. Overland

Crew Training School Produces Top Quality Operating Personnel 16

Ideas At Work: *Twelve Tips on Industrial Gas Meter Repair* ... 19

Meter Cleaning by "Rotoblast" 20
W. P. LeBlanc

Modern Methods of Service Request Dispatching: Part 2 — *Radio Speeds Dispatching for Michigan Consolidated* 24
J. L. Joachim

New Compressor-Equipped Trucks Help Improve Service Operations 29

Columbia Gas System Service Corporation Opens New Building 30

American Gas Fundamentals: *Gas Calorimetry — Part 1* 33

How to Write a Readable Business Report 37
H. E. Carroll

How To Give Orders Effectively. Another in the series to help you "Toward Better Management" 38
Ernest W. Fair

Northern Illinois' New Meter Shop "Modern as Tomorrow" 41

LOAD BUILDING

Purchaser Protection Plan Pays Profits, Builds Business 31
Kenneth C. Reed

NEWS AND FEATURES

MCF Pictorial 3
MCF 4
The Law 11
Ideas At Work 19
American Gas Fundamentals 33
Toward Better Management 38
Coming Events in the Gas Utility Industry 40
Gas Utility Industry News Events .. 43
Men at Work 44
New Gas Utility Equipment 46
Things to Write for 49
Advertisers' Index 50

YOU CAN GET MORE INFORMATION on 17 new and useful ideas or items of equipment developed for the gas utility industry. You'll find them on pages 46 through 50 . . . and to get more free information, use the handy reader's Ready-Reply Card bound in this issue. There's an extra card for your neighbor, too!

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NEWS-VIEWS OF THE GAS UTILITY INDUSTRY

AGA Convention Report

Robert W. Otto, chairman of the board, Laclede Gas Company, has been elected president of the American Gas Association at its 39th annual convention.

Other officers elected include: *A. W. Conover,* president, Equitable Gas Company, Pittsburgh, first vice president; *J. Theodore Wolfe,* president, Baltimore Gas and Electric Company, second vice president, and *Vincent T. Miles,* treasurer, Long Island Lighting Company, Mineola, New York, treasurer.

Directors elected for two-year terms: *Philip E. Beckman,* vice president in charge of gas operations, Pacific Gas and Electric Company; *Sheldon Coleman,* president, The Coleman Company, Inc.; *Clifford V. Coons,* executive vice president, Rheem Manufacturing Company; *R. E. Crawford,* president, Minnesota Valley Natural Gas Company; *Robert E. Ginna,* president, Rochester Gas & Electric Corporation; *H. Hansell Hillyer,* chairman of the board, president and general manager, South Atlantic Gas Company; *Chester L. May,* senior vice president, Lone Star Gas Company; *S. H. Nichols,* president, Iroquois Gas Corporation; *Ed Parkes,* executive vice president, United Gas Corporation; *John C. Parrott,* president, Roanoke Gas Company; *John C. Peterson,* president, Manufacturers Light & Heat Company; *Edward H. Smoker,* president, United Gas Improvement Company; *Henry Tuttle,* president, Michigan Consolidated Gas Company; *S. D. Whiteman,* president, Kansas-Nebraska Natural Gas Company, Inc.; *D. K. Yorath,* president, Northwestern Utilities, Ltd.

In addition to the 15 industry executives, *C. H. Zachry,* immediate past president of AGA and president of Southern Union Gas Company, Dallas, Texas, automatically became a member of the board of directors at the expiration of his one-year term as president of AGA.

First annual Public Relations Achievement Award is presented by AGA President Zachry to Southern California Gas Company for its "Facts About Natural Gas" program, cited as "the year's outstanding contribution to greater understanding of the gas industry and modern gas service." Accepting the award is F. M. Banks, president and general manager of Southern California Gas, as Frank C. Sullivan, company's director of public relations, holds desk replica of trophy.

Convention speakers at final general session of the 39th annual AGA convention include, left to right: Mrs. Denny Griswold, editor and publisher of Public Relations News, who spoke on public relations in the gas industry; J. J. Hedrick, president of the Independent Natural Gas Association of America and president of The Peoples Gas Light and Coke Company, who spoke on "Just Plain Work Ahead"; Rabbi Jerome Grollman, United Hebrew Temple, St. Louis, who delivered the invocation.

Gas industry unity from the view point of four segments of the industry was discussed by, left to right: C. H. Murphy, Jr., president of the Murphy Corporation, El Dorado, Arkansas; Paul Kayser, president of El Paso Natural Gas Company; Stanley H. Hubson, president of the Geo. D. Roper Corp., Rockford, Illinois, and Marvin Chandler, president of Northern Illinois Gas Company, Aurora, Illinois.

AGA leaders at the 39th annual AGA convention in St. Louis are, left to right: Treasurer Vincent T. Miles, Long Island Lighting Company; Second Vice President J. Theodore Wolfe, president of Baltimore Gas and Electric Company; Managing Director Chester S. Stackpole; Secretary Harold S. Walker, Jr.; President-elect Robert W. Otto, chairman of the board of Laclede Gas Company, and retiring President Clare H. Zachry, president of Southern Union Gas Company. Not present for picture was First Vice President A. W. Conover, president of Equitable Gas Company.

Void in the gas refrigerator department may be filled in early 1958 with models from new firms on the scene using imported equipment. One promoter, who has long acquaintanceship with the gas industry, plans to import the Electrolux gas refrigeration unit, combine it with American-made cabinets of ultra-modern design, complete with an ice cube maker, and sell it through utilities and selected dealers . . . at a price below former Servel units. Unit will feature simplicity in both exterior and mechanical design, be easy-to-service, and the design should have top homemaker appeal. Another unit, being promoted from the West Coast, features a gas refrigerator made in Europe, with modern design, to be offered in complete range of sizes — including 2, 4, 7, and 10.5 cu ft models. Who'll take over the Servel refrigerator? Nobody's talking these days . . . but several prominent appliance manufacturers are interested.

Distribution system construction is proceeding rapidly in four Ontario communities to be served by Lakeland Natural Gas, Ltd., Kingston, Ontario. New systems, in Cornwall, Port Hope, Belleville, and Gananoque, are expected to be ready for a turn-on of gas by the first of the year. Construction is being handled by Donovan Construction Company of Canada, with design and engineering supervision by Commonwealth Services, Inc., of New York City.

Mid-November completion date is set for construction of a gas distribution system in Lindsay, Ontario, by The Consumers' Gas Company of Toronto. Three contractors — F. E. Shaw, Ltd., H. B. White Contractors, Ltd., and R. B. Somerville — are laying a total of 90,000 ft of 2, 4, 6, and 8-in. steel pipe. Entire system is to be completed in an approximate 6-week period.

Committees are becoming a way of corporate life in all aspects of company operations, reveals a survey conducted at a recent American Management Association general management conference. Use of committees has greatly increased in companies of all sizes. What do they do? Mostly exchange views and information, plus making recommendations, generate ideas, and make some "major" decisions. Committees are also gaining in power. Most executives surveyed felt present degree of authority was satisfactory; some wanted committee authority increased.

Acquisition of Geo. D. Roper Corporation's appliance division and its sales subsidiary by Florence Stove Company was announced in late October. Florence assumed Roper's gas range and clothes dryer business on October 31, and will continue to market Roper products under that name. Florence also will continue manufacture of Kenmore and Florence gas ranges for both the regular retail trade and mobile home builders. Top appliance division personnel of Roper will join the Florence organization.

Natural gas requirements of Brooklyn Union Gas Company continue to exhibit a tremendous growth, reports John E. Heyke, company president. In 1950, the company had an initial contract for 60,000,000 cu ft per day. In 1956-57, requirements were 155,000,000 per day and the 1957-58 winter season will be 190,000,000 cu ft daily. In the next 12 years, these requirements will be four times the present needs. Heyke, speaking to a group of analysts, bankers, and investors, predicted general prosperity and tremendous growth for the gas utility for many years to come.

AGA Annual Meeting Highlights: Retiring AGA President Zachry told the convention that a new smokeless-odorless gas incinerator has been developed that will soon be offered for sale. He urged utilities to unite in promotion of this improved appliance . . . J. C. Hamilton, president of Arkansas Louisiana Gas Company, reporting on his firm's recent acquisition of the Servel air conditioning division, said an entirely new management has been formed and will manufacture and sell the 3½ and 5-ton "Sun Valley" units next year, with price reductions across the board if sufficient advance orders are placed by the utilities . . . Active promotion of year 'round gas air conditioning is planned by AGA's Air Conditioning Promotional Committee, reported J. Theodore Wolfe, chairman of the AGA Gas Industry Development Committee.

Eighty percent of the natural gas available in the Pembina field near Edmonton, Alberta, has been contracted for by Alberta and Southern Gas Company, Ltd., for its proposed 1300-mile Alberta-to-California pipeline to supply West Coast customers. Pembina could supply up to 65,000,000 cu ft per day. Earlier, Alberta and Southern contracted with Shell Oil Company for 200,000,000 cu ft per day deliveries from Alberta fields for the line.

All restrictions on natural gas sales for home heating in Michigan have been lifted by the state PSC except for areas served by Consumers Power Company in mid-Michigan. Utilities that can now take unlimited orders for home heating service include Michigan Consolidated Gas Company, Citizens Gas Company, Battle Creek Gas Company, Michigan Gas Utilities, and Michigan Gas and Electric Company. Consumers was only utility to object to a commission order directing firms to show cause why restrictions should not be lifted. Consumers claims it cannot supply gas to about 144,000 customer applicants because of a short gas supply — which commission observers said might continue for one or two years until supplies can be obtained.

Work will begin in early 1958 on underground storage for LPG near La Porte, Indiana, where Northern Indiana Public Service Company will spend $2,500,000 and 18 months on a vast honey-combed network of rooms mined at a depth of 350 ft below the surface. Estimated capacity of the cavern will be 300,000 bbl of LPG. The LPG will be used at LPG-air plants for peak shaving purposes at East Chicago, South Bend, Fort Wayne, and Peru.

Pacific Gas and Electric has amended its application in a pending gas rate increase case and proposed spreading among all customers on its system a rise in cost of gas purchased from out of state. The new proposal would mean an increase of 15 cents per month to the average domestic customer — instead of 30 cents per month as originally planned. Increased rates are planned to go into effect when rates of El Paso Natural Gas Company go up on January 1, 1958. El Paso supplies 69 percent of PG&E's total supply.

Detailed financial and other data being sought by the FPC from gas producers is "unnecessary" and have "no bearing on the natural gas business," spokesmen from several companies told the FPC at a recent hearing in Washington. Protesting the proposed new ruling being considered by the FPC, they said the new rule would impose a "terrific burden" on thousands of producers, but would be of doubtful use to the commission. Information sought would involve more expense and preparation than would be justified. Producers are protesting in particular section 4 of the ruling asking for detailed balanced sheets on all income sources. For major oil companies, this would be a gargantuan task— as it would have to include income from such things as sales of tires, batteries, refined products, etc., ad infinitum.

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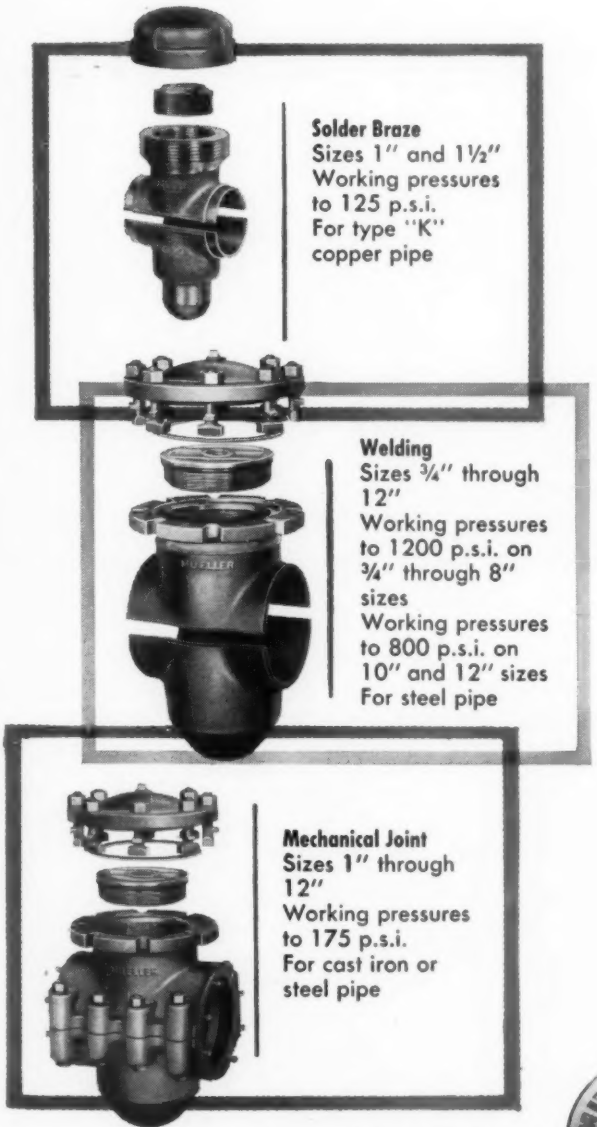

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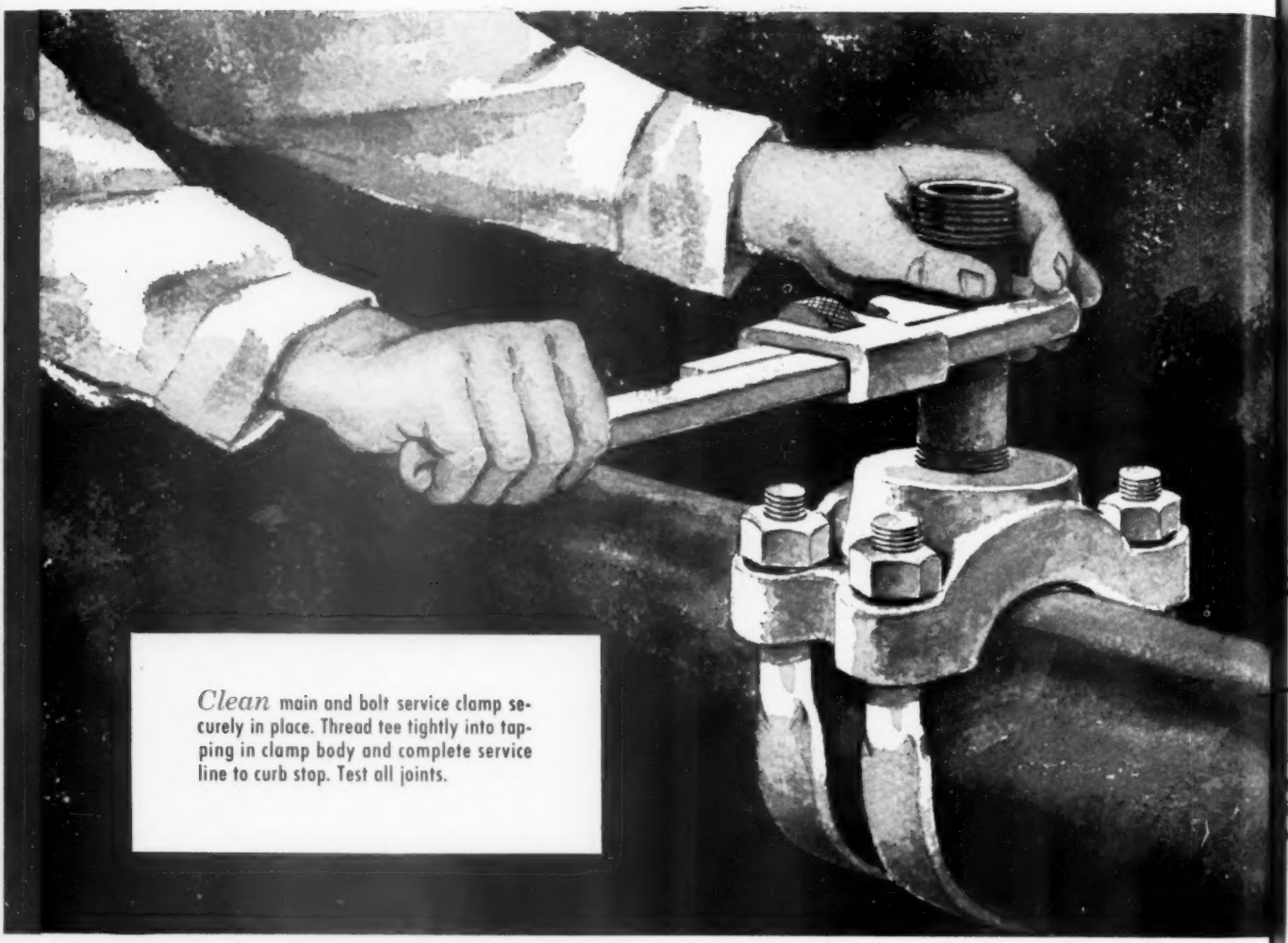
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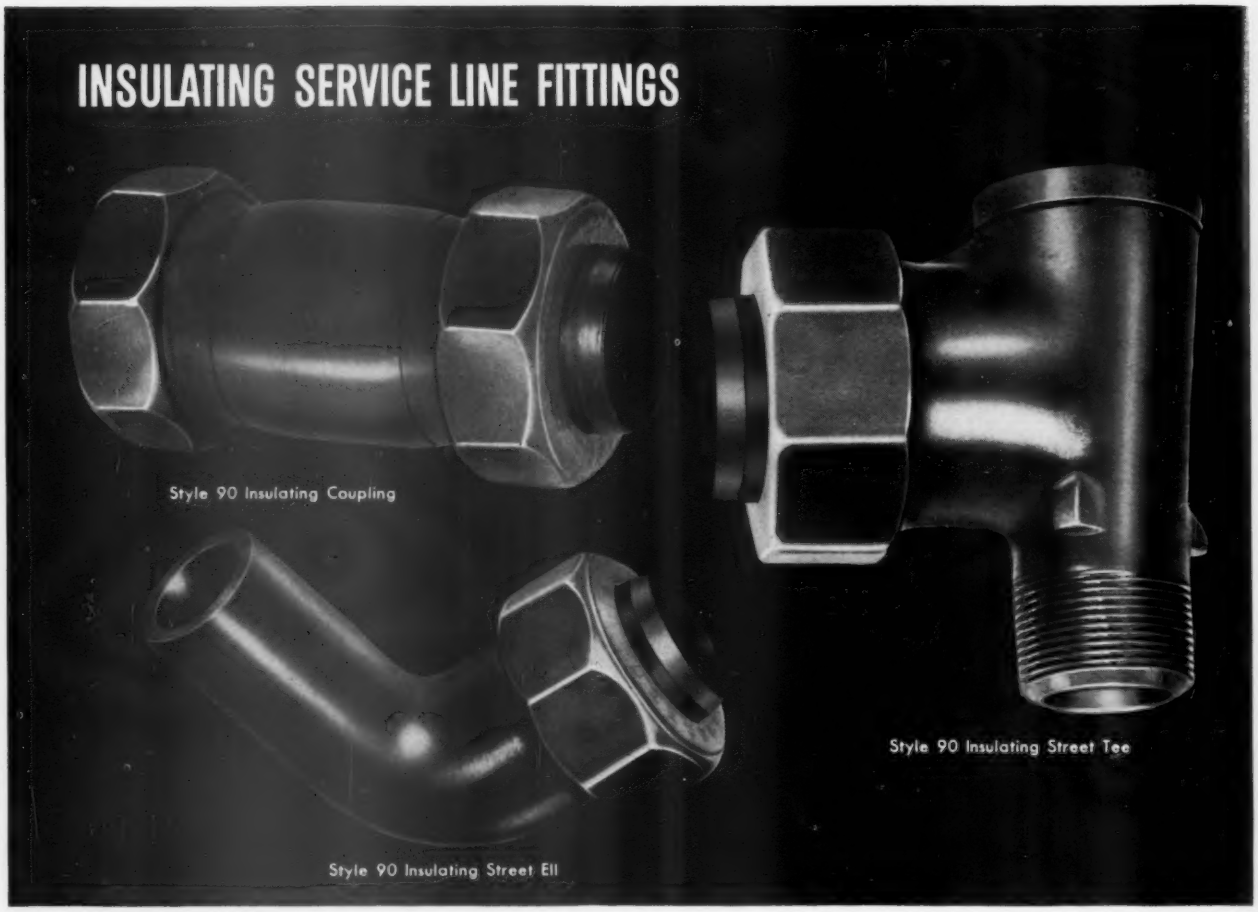
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ROCKWELL GAS METERS AND REGULATORS

Prepared by Leo T. Parker, attorney at law and contributing editor

Blasting Damage Liability Varies Among States

"Is a gas corporation liable for damages to adjacent private property caused by blasting if the testimony does not prove that the gas corporation's employee was negligent in doing the blasting work?"

Some gas utility officials state that under no circumstances is a gas corporation liable for damages to adjacent private property and dwellings unless the evidence clearly shows that the blasting was performed negligently. The fact that this contention is correct in some states but not the law in other states results in an interesting question of law.

Quite obviously, the higher court citations in this article will assist readers to prepare to avoid complicated legal controversies in various states and, also, these citations can be advantageously used by readers and their lawyers to win unavoidable suits.

The fact is that blasting liability differs in various states. In a few states, the courts hold one who does blasting is not liable in damages for injuries to private property caused by concussions and vibrations, unless testimony convinces the court that the operator negligently performed the blasting. In other states the courts hold that under the same circumstances the operator is liable if the property owner merely proves that his property was damaged by concussions and vibrations from blasting operations.

On the other hand, in a great majority of states the higher courts hold that a gas corporation always is liable for damages and injuries to adjacent private property caused by rock, dirt, and other materials being thrown upon such private property by blasting operations.

Concussion Liability

In *Rahm v. Material, 133 N. E. (2d) 733*, testimony showed facts, as follows: Several owners of dwellings in the State of Illinois sued the corporation and asked the court to issue an injunction restraining it from continuing blasting operations. Also, these dwelling owners sued for damages to their property caused by blasting operations.

During the trial, the testimony disclosed that the dwellings were damaged by blasting operations. These property owners merely alleged that the corporation was liable for injuries to their dwellings by concussion and vibrations caused by blasting.

The corporation contended that it could not be liable in damages to the dwelling owners, first, because no proof or testimony was given that the blasting operations were negligently performed, and second, because the dwelling owners failed to show specific acts of negligence such as the exact time or dates when damage occurred and the precise places and times the blastings were set off, the amount of explosive material used, and the condition of the subsoil when the blasts took place.

Irrespective of this testimony, the higher court indicated that the dwelling owners are entitled to recover damages from the corporation, and said:

"It is not necessary to equate the damage with any specific explosion; indeed, it would be impossible to assess the damage resulting from each particular blast or series of blastings, since the damage may not result until some time subsequent to the blast. Plaintiffs (dwelling owners) would not be likely to make a record of the incidence of blastings, nor would they be in a position to know the precise place where the blastings were set off, the amount of explosive material used, or the exact periods when the blastings occurred; neither would they know the condition of the subsoil where the blastings took place."

This court also indicated that, under the proof and testimony given, the dwelling owners are entitled to an injunction restraining them from carrying on further blasting operations. In this respect, the higher court said:

"It would seem absurd that any refinement of reasoning as to nuisance *per se* or as to injury, consequential or by physical invasion, should be permitted to obstruct the natural justice of a rule which would make one who chooses for his own convenience or profit to use agencies which in their probable and natural results will injure the property of others, answerable for the loss occasioned by such injuries."

For comparison, see *Simmons & Connell v. Braun & Fitts, 94 Ill. App. 533*. Here a property owner in the State of Illinois brought suit against a gas corporation to recover damages to his brick building caused by blasting done by the corporation in the construction of a tunnel. The court held:

"The jury are instructed as a matter of law, that a person uses a dangerous explosive at his peril, and that if the use of such explosive causes injury to the property of any other person, the person so using such dangerous explosive is in law liable for the damages so caused."

Law of Ohio

For the law of blasting liability in the State of Ohio, see *Bradford Glycerine Co. v. St. Marys, 60 Ohio St. 560, 54 N.E. 528, 45 L.R.A. 658*. Here private property was injured during blasting by concussion or vibration. This court said:

"When the corporation by blasting destroys the buildings of an adjoining landowner, it is no defense to show that ordinary care was exercised in the manner in which the quarry was worked."

And, in the states of Iowa, Montana, Rhode Island, South Dakota, Washington, Massachusetts, and Minnesota the higher courts hold to a positive liability for injuries to private property caused by blasting whether direct or consequential.

In other words, the higher courts in these states hold that a gas corporation which does blasting always is liable to an owner whose property is damaged by rock, debris, etc., thrown onto the private property and also by concussions and vibrations.

This is so, although no proof or testimony is given that proves that the property damages resulted from negligence of the gas corporation. For higher court cases in other states that hold likewise, see *Hickey v. McCabe 30 R.I. 346, Baier v. Glen Alden Co., 131 Pa. Super 309.* ★ ★ ★

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NOV 25 1957

Trencher cuts ditch for service line.

Lowering 4-in. coated pipe.

Winters Will Be Warmer As . . .

Natural Gas Comes t

FOR SEVERAL YEARS C. H. Sonnenberg, superintendent of municipal utilities in Watertown, South Dakota, told prospective gas customers, "Please be patient, as soon as gas is available you will be served." Now he can say, "Natural gas is here — come and get it!" With a completely new gas distribution system installed, the big problem now is to keep prospective customers happy. Service crews are working at full speed and the back-log of service orders is still growing larger. Service requests are running about double the anticipated rate.

The City of Watertown, South Dakota, is located in the eastern part of the state, and has a population of approximately 15,000. The utilities are all municipally owned and operated, including a steam power plant and a steam distribution system serving the central business section.

Originally, Watertown was served by by a privately owned manufactured gas system, and when the gas company decided to sell its holdings, the city unexpectedly found itself in the gas business. Shortly after acquiring the gas plant, they modernized it by converting it to a 700 Btu LPG-Air system.

The existing distribution system is more than 50 years old, and consists of bare steel pipe with screwed joints. Considering its age, it is in good condition and has presented few maintenance problems.

Distribution pressures averaged about 8-oz and during cold weather, pressure had to be increased to serve the customers at the end of the line. This presented a problem of excess pressure near the gas plant. Not having service regulators on the old system, a potentially dangerous condition existed, which has been partially alleviated by installing regulators on services near the plant.

The existing plant is a propane-butane-air type, with a capacity of 30,000 cfh. It served 1100 customers, including 50 residential heating and several commercial and light industrial customers. Maximum peak daily send-out was approximately 350,000 cu ft. For the present, the existing gas plant will not be needed for peak shaving, so work on this phase of the project has been deferred for several years.

Natural Gas Service

The original natural gas demand rate was 2,201,000 cu ft per day and it is expected to be raised to 4,350,000 cu ft in five years. Considering the enthusiasm shown upon the arrival of natural gas, the system should have no trouble meeting the estimate.

Ralph D. Thomas and Associates were first retained to assist with the testimony for the attorney's intervention before the FPC in favor of Northern Natural's petition for the Aberdeen extension. Prior to approval of Northern's extension, they were advised to convert their existing system to approximately 1350 Btu "compatible" gas to relieve distribution difficulties during the winter of 1956-1957 and permit immediate utilization of the natural gas when it became available. Bids were received and Universal Gas Conversion Inc. of Mankato, Minnesota, completed the conversion in the fall of 1956.

Design of the system could not be started until the FPC approved Northern's request to serve the area. Therefore, when the approval was received, it was necessary to prepare plans and specifications and let contracts as soon as possible.

System Design

After obtaining the necessary field data, several layouts were thoroughly investigated and discussed. When the final layout was approved, plans and specifications were completed for bid-

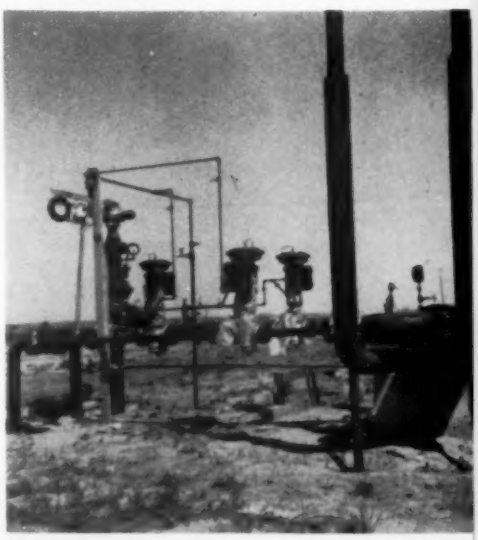
Welding 1¼-in. uncoated house service line.

All coated pipe was checked with holiday detector.

D. Overland
Gas Department
Ralph D. Thomas and Associates, Inc., Engineers
Minneapolis, Minnesota

t Watertown

Two views of town border station. Above is end of orifice meter run. Below is pressure regulation equipment.



ding purposes. On October 24, 1956, bids were received on 320,000 ft of pipe and for the installation of the distribution system. Luckily, 12,000 ft of 8-in. pipe was obtained in time for Underground Constructors, Inc. of Dodge Center, Minnesota, to proceed with the first phase of the project without delay. There was a great urgency to rush an initial high-pressure line from the town border station to the gas plant and install temporary district regulators to the existing system before Northern completed its town border station. Fortunately, the work crews finished before arrival of both Northern's line and the frost.

Main feed into town is approximately 11,000 ft long, crosses under two small rivers, a federal highway, two railroad tracks and passes through a wet area for a distance of about 4000 ft. A temporary district regulator was installed at the southernmost point of the existing distribution system to supplement the main feed at the gas plant and also relieve the old system of the firm load at a local meat-packing plant.

Natural Gas Arrives

On the coldest day of the year, January 30, 1957, (it warmed up to 7 below zero), valves were opened and Watertown received its first natural gas. All equipment and appliances worked perfectly during this switch-over. The telephones were very busy though, answering reports of gas leaks prompted by the accidental spilling of a half-gallon of odorant at the town border station.

Design of the system presented a few relatively minor difficulties. Most troublesome was the presence of three railroads and a river that divide the city into three physically separated areas, with these areas being again divided by state and federal highways. These factors dictated to a great extent the location of the high-pressure mains and the medium pressure feeders.

The system of distribution is basically a loop system with the south section served by two loops and four district regulators, the north by two district regulators, and the west by one district regulator.

Maximum expansion of domestic services is anticipated in the north end of town, and this is the most difficult to adequately serve because there are only two routes available for feeding this section without crossing railroad yards. The north section has several cross-connections within the main loop

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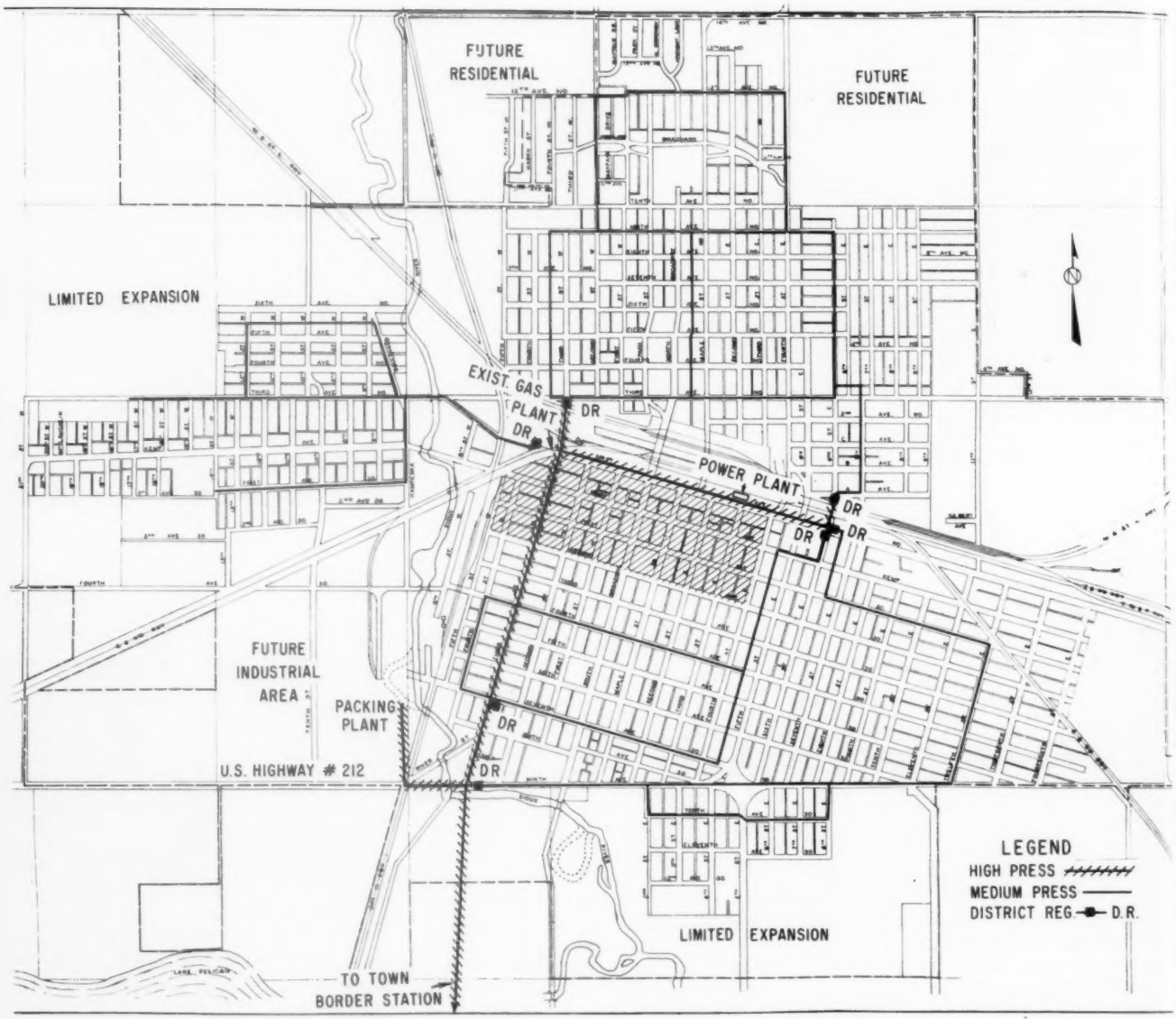


Map shows layout of Watertown's new distribution system.

and provision for easy expansion. The main feeders from the district regulators are amply sized to permit service to several hundred domestic heating customers beyond the 1962 level, with distribution pressure of 8 psi. If growth exceeds expectations, the pressure may be raised to increase the capacity.

Can Be Expanded

The west end of town is basically small residential, with a few small commercial and industrial buildings. The anticipated expansion in this area is slight and, for the present, the loops will not be completed. Just south of this area is one that is scheduled for industrial development and this area will be served by a 6-in. high-pressure line. At present there is a large packing plant in the area that will provide an interruptible load of 40,000 to 60,000 cfh. It is anticipated that this line will have sufficient capacity to provide for the expansion of this area and also provide a second source of supply to the west section if unexpected expansion should require it.

It was found that the south section would best be served by double feeders, consisting of a small loop between the federal highway and the main business section fed from both corners and a feed line paralleling the highway and then running north to pick up the easterly part of town. The line adjacent to the highway will serve the extensive commercial development now taking place along the highway. This line is fed at both ends and can easily be connected to the smaller loop.

The business section consists of a 25-sq block area and is served by a municipal steam system. Potential gas demand is so small that it would not be worth while to include this area in the new construction. Old gas piping will be replaced whenever it is necessary to dig up the streets for improvements, such as widening, paving repair, water, sewer, steam or electrical work. About 25 percent of the mains have already been replaced and complete renewal is expected in three to five years. Distribution pressure in this part of the system will be maintained at its present 8-oz maximum until the rehabilitation has been completed.

Interruptible Load

Watertown presents an excellent situation insofar as interruptible load is concerned. Installation of gas burning equipment has just been completed on one boiler in the municipal power plant, which will provide not only the inter-

Main was carried across Sioux River by using pipe hangers on side of highway bridge.

Above-ground district regulator station, complete except for painting.

Service line of 1¼-in. pipe is shown strung out, ready for lowering-in and backfill.

Building pit for district regulator station.

Below-ground district regulator in pit, ready for operation.

ruptible load on power generation, but also on the heating load of the business section. This one installation will result in greater economies for the steam and electric departments, profit for the gas department, and also reflect savings to the consumer. In the near future, gas burning equipment will be installed on another boiler, bringing the load up to about 200,000 cfh for the one interruptible load. At this time, a second high-pressure line will be run from the town border station through the eastern part of town to connect to the end of the line that goes to the power plant.

Other interruptible loads include two packing plants, a hotel, creamery, produce company, seven schools, and three hospitals. Many residences, several shopping centers, motels and other commercial establishments are now heating with bottled LPG and they are converting as fast as the service crews can connect them.

Low Pressure Used

The distribution system is designed for operation at approximately 4 psi during the first few years of service and will be increased to 8 psi when the firm load approaches design conditions. Each section of town may be operated at a different pressure depending upon the saturation of the individual sections. Distribution pressures may be increased to 25 psi if the future need should arise.

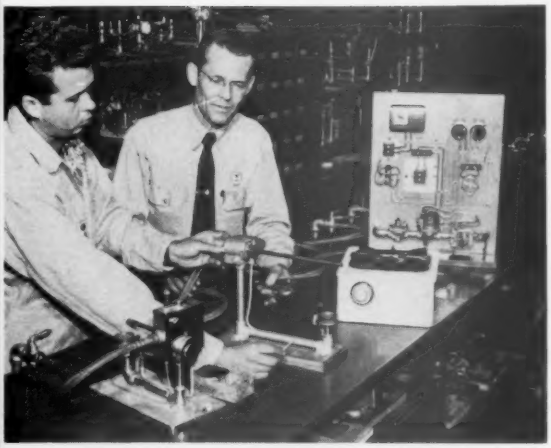
Wherever practical, the loops and distributors were laid in alleys and utility easements to reduce cutting in the many paved streets. Services are somewhat longer than usual, but the total cost of the project was kept to a minimum.

Loops range in size from 4 to 8-in. with 3 and 4-in. cross-connections and 2-in. distributors. All pipe is factory wrapped API 5L or ASTM A53. All joints are tapecoated.

Except through the wet area between the town border station and the city limits, no cathodic protection has been installed. A complete survey will be made in 1958 and necessary cathodic protection installed at that time.

Services enter buildings aboveground wherever possible to prevent migration of leaking gas into consumers' premises. Because electric, water, and gas meters are read at the same time, every effort was made to install all meters on the inside of the premises. In several places it was necessary to install the meter on the outside. The gas department plans to run tests on meters containing temperature correction devices on the outside installations. ★ ★

Use and care of pneumatic tools is explained by staff instructor Harold McVey as trainees Jerry Jared, Eastern Division; and Myron Nelson, San Gabriel Valley Division, learn to be crewmen by doing jobs they will be expected to perform in their own divisions.



Trainee Paul Arata learns light-up techniques as senior staff instructor Les Dimon watches. Southern Counties Gas Company uses its central training facilities in Los Angeles to give job instruction to metermen, customer servicemen, service mechanics, and crewmen.

Light-up work on appliances is supervised by staff instructor Harold McVey (center), of Southern Counties Gas Company's customer service department. Training to become construction and distribution department crewmen are, left to right, Jerry Jared, Eastern Division; Myron Nelson, San Gabriel Valley Division; Paul Arata, Santa Barbara County Division; and Chuck Slattery, Eastern.

At Southern Counties Gas Company . . .

Crew *Training School* Produces Top Quality Operating Personnel

Technique of locating underground pipe is learned by future crewman Chuck Slattery, under the watchful eye of senior staff instructor Les Dimon.

A CENTRAL TRAINING SCHOOL at its Los Angeles operating base helps fast-growing Southern Counties Gas Company of California meet its expansion problems by providing accelerated job instruction for personnel in its eight operating divisions.

The big gas utility, which now serves more than 600,000 customers in a highly populated 1200 sq mile strip of Pacific Coast territory, started its formal training program in 1946. The company then had only 255,000 meters on its lines. The first training was done in the individual operating divisions, initially by staff instructors and then by division personnel.

By 1951, the present central training school had been established. The reasons for the move from a decentralized program to central training, according to customer service manager A. D. Petersen, were the ability to provide a better physical layout in a single location than in eight separate locations, the fact that there were not enough people requiring training to call for the continued operation of a training program in each division, and

Darrell Milton (left), who has immediate responsibility for Southern Counties Gas Company's central training school, goes over crew training class schedule with senior staff instructor Les Dimon (center) and staff instructor Harold McVey. School has four instructors, teaches personnel from the company's eight operating divisions. It is run by the customer service department.

Crew training class learns to tap main without allowing gas to escape. Average size class is seven trainees, and largest ever was 14. Small class of four pictured here was caused by unexpected work load in divisions which required that several employees scheduled to take course remain on the job.

Two methods of locating underground mains and services are taught at Southern Counties Gas Company's central training school. Staff instructor Harold McVey (left) teaches Myron Nelson, San Gabriel Valley Division, and Paul Arata (right), Santa Barbara County Division, the two-man method. In background, senior staff instructor Les Dimon teaches Chuck Slatttery the one-man method.

the fact that a central training school would provide uniformity not possible with eight different schools.

Four Types of Training

The central training program now includes four basic courses designed to train men for four job classifications. Three of these courses are for the customer service classifications of *meterman, serviceman* and *service mechanic*. The fourth course is given for the construction and distribution department and it trains the employee for the classification of *crewman*.

Most of Southern Counties' present 77 metermen, 189 servicemen, and 15 service mechanics have received the instruction, as have many others who have since been promoted or have left the company.

The central training is handled by a staff of four instructors who report directly to staff training representative Darrell Milton. The meterman and serviceman classes are three-week courses, and the full service mechanic course runs four weeks. The crewman training class is a two-week course and was initially started in 1951. Since that time 49 classes have been given and 388 crewmen trained for the company's eight operating divisions.

The crewmen are trained by the customer service department because customer service already had the physical classroom facilities, and also because an important part of the crew training consists of work with meter sets and light-up work with appliances, both of which are used in the training of customer service personnel.

Crew training is designed to familiarize the trainee with the tools, equipment, and operations common to crew work. It is also designed to introduce techniques, basic skills, and accepted standard practices of the company to the trainees.

"We also stress background information, which explains many of the reasons why the crewman's job is important and the reasons for company policies and procedures," says customer service manager Al Petersen. "And techniques of promoting and maintaining good public relations are combined with every phase of the training where they are applicable."

How Program Is Conducted

The fast and intensive crew training course is given to men who have usually been working with the company several months. The best class size, according to supervisor Milton, is from six to eight trainees, but classes have varied from 4 to 14.

One of the school's four instructors can handle a class of up to eight crewmen, but larger classes have two instructors assigned to them.

The students are usually field assistants (the company's starting job classification), but some are temporary crewmen when they attend school. No one may be promoted to permanent status as a crewman without having first successfully completed the central training course.

Classes are scheduled on a quarterly basis in advance after the eight operating divisions have been consulted as to their need for trained personnel. The types of classes being given at any time vary according to the need of the divisions for metermen, servicemen, or crewmen. After class schedules are made up for the coming quarter, they may be revised at the request of divisions with special or unforeseen personnel needs.

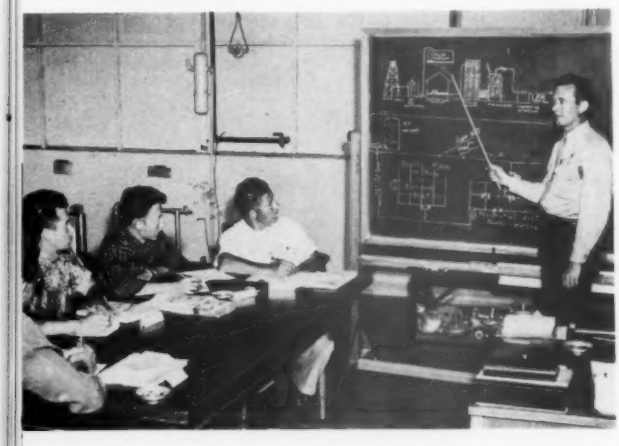
Five of the operating divisions are located in the Los Angeles basin area, close enough for the trainees to drive back and forth to school each day from their base. However, trainees from Ventura, Santa Barbara, and San Luis Obispo counties are lodged at company expense during the training period in a motel close to the central training location.

After completing the course, students return to their own divisions where their supervisors or crew foremen continue their training with on-the-job instruction.

Must Meet Standards

All trainees are judged and graded on ability to pick up basic skills;

Crew training class at Southern Counties Gas Company's central training school finds staff instructor Harold McVey explaining flow of natural gas from well to customer's home.



Gas service work in Southern Counties Gas Company's crew training class includes building the meter set and tying on to the customer's piping, as well as other routine operations with meters.

Sniffer survey to locate possible gas leaks is taken by Paul Arata (left), and Jerry Jared, during two-week crew training course given by Southern Counties Gas Company. Teacher is senior staff instructor Les Dimon.

mechanical ability in handling tools and equipment; observance of safety rules; general conduct, attitude, and appearance, and understanding of good customer relations.

During the two weeks of crew training school, the students are given written tests, oral tests, and practical work tests. If his performance is below established standards for the course, a trainee is advised of his standing and given a chance to improve, but if improved performance is not forthcoming, the trainee is washed out and sent back to the division.

After a trainee has completed the course and returned to his division, a written report is prepared by the class instructor and forwarded to the division, advising them of the trainee's performance in the class and giving any observations or recommendations concerning the man that will be of help to the division supervisor.

If a trainee has completed the course but has left some doubt in the mind of the instructor of his ability to become a competent crewman, the trainee's division is immediately notified of this by telephone. The trainee can then be given closer supervision by his foreman and additional on-the-job training before reclassifying him to a new position.

Full Background Given

During the two-week crew training course the student is given an introduction to operation of the gas company and told the scope of the course and the objectives of training.

He is then taught how to make preliminary surveys and investigations such as a vegetation survey, bar testing, and soil testing.

Following this comes intensive instruction on gas main operations. The trainee is taught such things as locating underground facilities, proper methods of making excavations, aboveground preparation and inspection and testing of new mains.

He is taught the principles of installing main extensions, connecting services to new mains, backfilling and cleanup work, and replacing existing mains. Other gas main operations covered are relocation of mains, main repair, and installing distribution valves, meters, regulators, and filters.

The trainees' instruction in gas service operations includes principles of installing a new service, and retiring or renewing a service.

Other types of service work covered are greasing service cocks under pressure, installing branch services, relocating meters and service risers, relocating a yard service, and repairing leaks.

Other sections of the course cover basic pipefitting, use of tools, and meter setting. In addition to learning to build meter sets, crew trainees learn to fill out the work order forms used in connection with this work.

Appliance Service Studied

Final phase of the course is concerned with turning on gas and relighting appliances. This includes a fundamental knowledge of how appliances and controls function and in making the necessary checks to insure that the customer's premises are being left in safe condition.

Training Is Effective

At the present rate, Southern Counties' training program is giving instruction to approximately 150 employees per year.

That it is doing an effective job is attested to by Tom Banks, superintendent of the company's San Gabriel Valley Division.

"We couldn't get along now without the crew training school," Banks says. "A few years back when the company and the area weren't growing so fast, an employee usually remained a field assistant for four or five years before he became a crewman.

"In that time it was possible to teach him the things he needed to know. Now our field assistants are only with the company about six months or so before we have to make them crewmen. The school helps us considerably." ★ ★ ★

12 Tips on Industrial Gas Meter Repair

Twelve tips on repair and reconditioning of industrial gas meters are offered by Rockwell Manufacturing Company engineers. To restore old meters to service they recommend:

1. Valve-Grinding

Emery or carborundum paper carefully mounted on heavy plate glass blocks provides as true a surface as is possible to obtain commercially. Either wet or dry paper may be used, and should be brushed often when grinding to keep specks of metal from accumulating. The emery paper is attached to the block by use of shellac or sealing wax; it is important to get a thin, even coating in order to maintain flatness.

2. Grinding Thickness

The size of the block used for grinding should be larger in area than the valve or seat being ground. In the case of domestic cast meters, a block large enough to grind both valve seats simultaneously is recommended.

Care should be exercised to keep the block flat while grinding. A minimum of material should be removed and a "Figure 8" grinding motion will produce a very good finish. No. 80 grit paper is satisfactory for a rough grind and finishing should be done with a No. 150 grit paper.

3. Cleaning of Valves and Valve Seats

In many instances, just a thorough cleansing of both valves and valve seats is sufficient to put the meter in first class working order. This cleansing can best be performed by use of any one of the many solvents such as benzene, alcohol, naphtha, etc.

4. Checking Valves for Flatness

The reverse side of the glass block that was used for grinding has a very good surface for checking valves or valve covers for flatness. If opposite corners of the block are tapped with finger tips when the block is so placed on the valve, rockiness or uneven grinding can very easily be detected.

5. Cements for Valve Seat to Valve Plate Sealing

Shellac or a glyptol type of cement are both satisfactory for sealing this joint. Glyptol is somewhat easier to work with and gives slightly better sealing results than shellac.

6. Reoiling Diaphragms

A mix which is very acceptable for reoiling of diaphragms would be a 4:1 ratio of Acme "D" oil to Petrolatum. This mixture should be heated to approximately 140 F before applying to the diaphragm leather.

It is recommended that the leathers be swabbed or sprayed rather than completely immersed in this dressing. An over-oiled diaphragm will be extra soft and flabby and will result in a greater meter proof change once the meter has been placed in service.

7. Grease for Packing Boxes

A non-fluid type oil having a consistency of cup grease can be used very satisfactorily in packing boxes to aid in lubricating felts and preventing leakage at these points.

8. External Cleaning of Meters

A caustic base stripper gives very good results in cleaning paint from meters. Other methods that are employed for removal of rust and other foreign materials are sand blasting, or wheelabrating.

9. The Meter Paint

A very satisfactory meter paint is a quick drying enamel with an epoxy resin base. This results in a very good protective coating and, due to its quick drying properties, facilitates meter handling in the repair shop. Additional coats or the use of a primer will naturally give the meter case better protection against the atmosphere.

10. Proving Techniques

Within the proving room itself the temperature should be constant — that is, the temperature of the air, the oil in the bell, and the meters themselves should be within ± 1 F for accuracy. All drafts and sources of heat supply should be kept as far away as possible from the testing equipment.

The bell prover itself should be clean, level, and free of binds. The air being passed through the bell for the meter proving should be taken from the proving room itself in order to maintain temperature balance. The prover should also be regularly bottled in order to check and maintain its degree of accuracy.

11. Meter Balance

The gas meter is like a combustion engine, and in order for it to maintain its ultimate performance it must be kept in balance to operate and run smoothly. Primary sources of unbalance are positioning of the valves, positioning of the diaphragms, and the coordination between the two. Any one of these three can disrupt the entire meter operation to result in erratic action, consequently high wear and poor meter performance over an extended period.

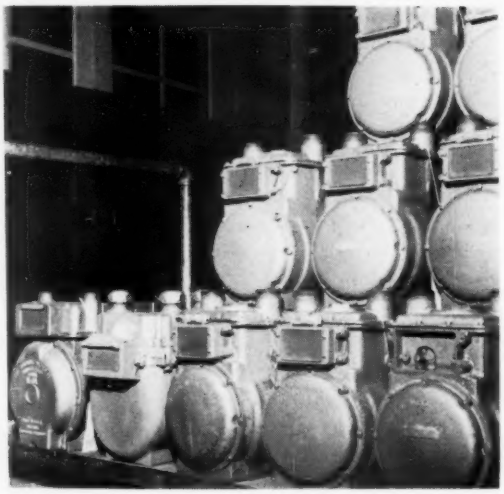
12. Testing Meter Performance

A slope or draft gage mounted in conjunction with the proving equipment can be a valuable asset in determining meter operations. This instrument is used to measure the difference in pressure between the inlet and the outlet of the meter while it is in operation on the prover.

Fluctuation of this differential pressure reflects the degree of unbalance, binds, or poor timing that is built into the gas meter. The gage will indicate very quickly any malfunctioning that has been built into the meter. ★ ★

Rubber mastic is used to protect index glasses from abrasive grit. Strip is being removed from reconditioned meter that has been blast-cleaned and spray-painted with primer coat.

BEFORE. Meters taken out of service in Gulf Coast area look like this — corroded and unsightly.



AFTER. Blast-cleaning removes all scale, leaves smooth surface, and meter is as clean as when first placed in service.

Meter Cleaning by 'Rotoblast'

W. P. LeBlanc
Distribution Supervisor
United Gas Corporation
Houston, Texas

IN THE GULF COASTAL REGION, because of the prevalence of warm, moisture-laden air, periodic cleaning and repainting of meters and regulators is extremely important in order to protect them against the oxidizing action of the air.

United Gas Corporation's Houston division has adopted new equipment and methods to achieve outstanding results in the reconditioning of meter and regulator cases. Increased speed, thoroughness, and efficiency have been reported since installation of a modern "Rotoblast" cleaning machine and allied equipment, which makes the entire job of cleaning and repainting possible in an atmosphere free of dust and paint spray.

Reconditioned meters and regulators emerge from the process as clean as they were when manufactured.

The Rotoblast is a machine that uses centrifugal force to spray a selected size of steel grit upon objects that need cleaning. Abrasive material is fed to a rapidly rotating, vaned wheel from which it is thrown by intense centrifugal force at the "target" — in this case, meters and regulators that have been

Views of Rotoblast show it at left with doors of the "table room" closed; doors are open in photo at right, showing how objects to be cleaned are positioned on floor of machine, and below, close-up of meter cases after blast-cleaning.

pulled out of service for reconditioning.

The unit is housed in a steel-jacketed, rubber-lined enclosure known as a "table-room." Including an abrasive separator and dust collector, the entire installation occupies less than 300 sq ft of floor space in the division's meter shop quarters. It stands approximately 16 ft high.

The circular "table-room" has two wide doors through which the meters and regulators are loaded and unloaded. During the cleaning process they are positioned on the floor of the enclosure.

For sufficient cleaning of most surfaces, the machine remains in operation from only two to three minutes. It shuts off automatically at the end of a predetermined period, so the doors can be opened and the objects re-positioned in order that all surfaces not exposed to the cleaning blast during the first run will be cleaned on a second run. After completion of the second run, the cases are completely cleaned and ready for painting.

Spent abrasive materials fall through openings in the floor of the room to an enclosed area below and are taken by elevator buckets to the separator and dust collector units where dust, debris and damaged abrasive are removed — leaving clean abrasive to be used over again.

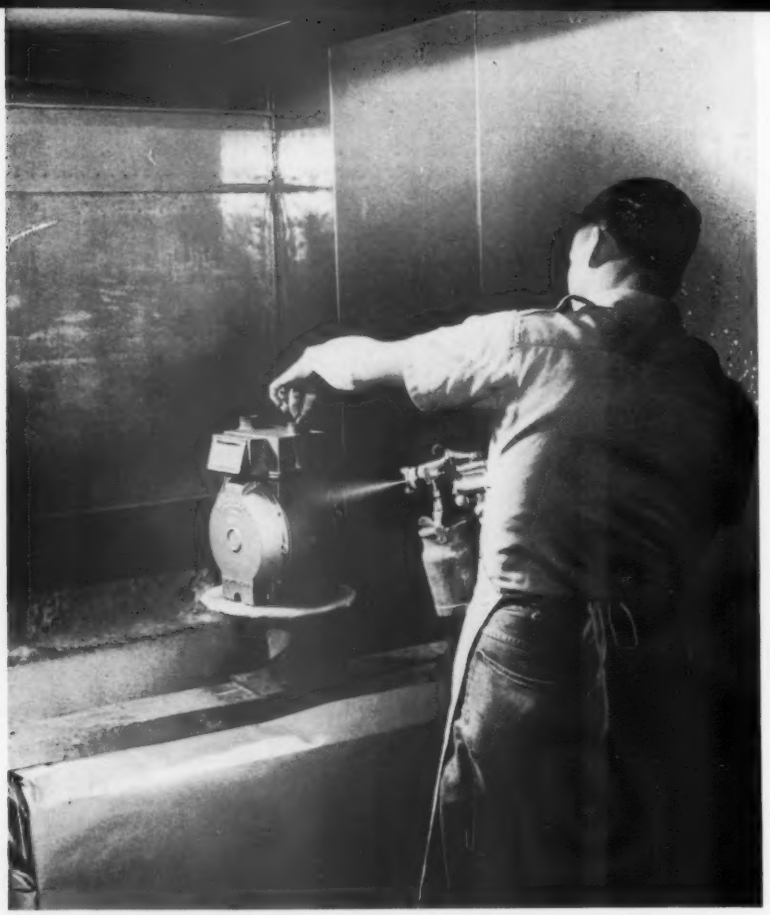
Care is taken to protect vulnerable parts of the cases during the cleaning period. Index glasses are protected by a patch or rubber mastic (first photo), and all cardboard record tags are removed before the meters are placed in the machine. As each meter is readied for cleaning, the tag is removed and placed on a hook identified by a letter of the alphabet *A, B, C,* etc. Rubber stoppers, with corresponding letters, are then inserted in both connections of the meters to prevent abrasive from getting inside the meter case. Identification after cleaning then becomes a simple matter.

Meters taken out of service and sent to the shop for reconditioning, test, and repair are first given an "in test" before being sent to the Rotoblast unit.

After being cleaned and given a primer coat, meters are repaired as needed, then proved and adjusted. Final painting is then given the meter and it is placed in an "OK" stack ready for further service.

The Houston meter shop handles approximately 12,000 new meters each year — each of which is checked out before being placed in service — and approximately 18,000 old meters are brought in for cleaning, adjustment, repair, and repainting.

Some 10,000 new regulators and



After cleaning, meter case is given spray coat of primer in water wash spray booth.

12,000 old regulators also pass through the division meter shop each year.

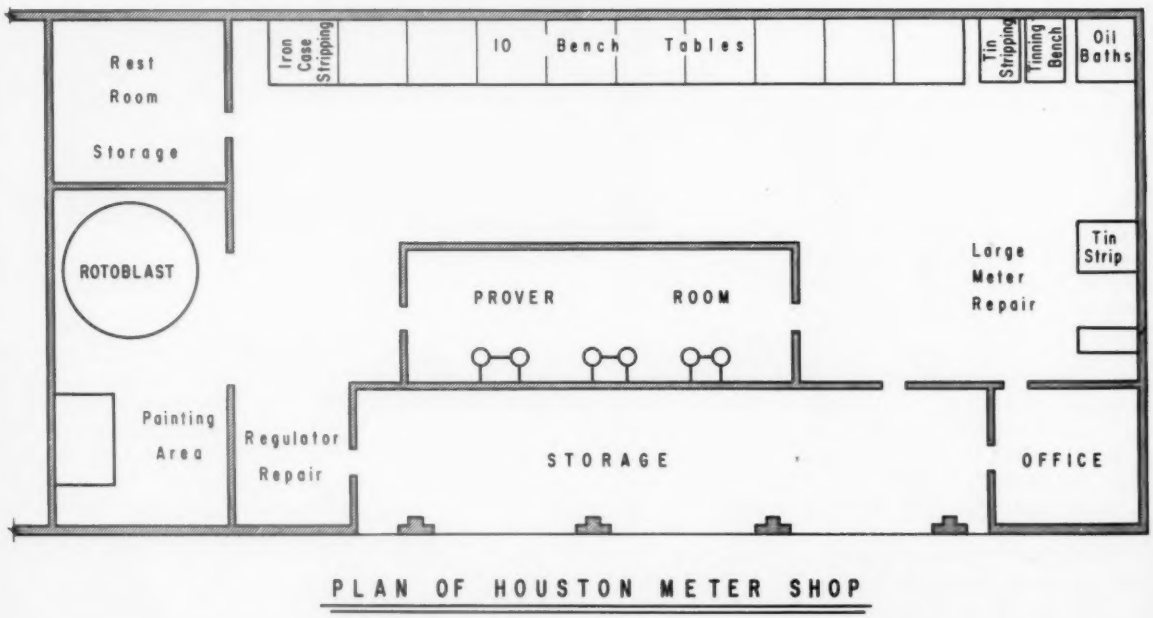
Primer Coat Applied Promptly

Immediately after cleaning, both meters and regulators must be spray painted with a priming coat to protect the cleaned surfaces.

This can now be done in a clean atmosphere, utilizing the shop's "water wash spray booth." Booth is approximately six feet wide, six feet deep and seven feet high. The back portion is covered by a slanted metal surface over which a curtain of water flows while painting is being done. An exhaust fan pulls the superfluous paint spray over the water screen and the paint particles are caught on it. The water drops into a collection tank for treatment and recirculation. It is treated with a special water wash compound that converts the paint into an emulsion which floats harmlessly on the surface water in the collection tank. Because the compound must be maintained in exacting amount, an indicator keeps the operator informed at all times.

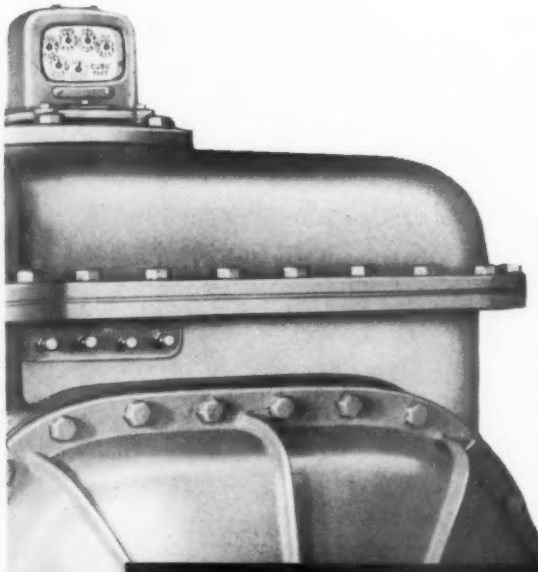
Residue must be skimmed from the surface of the water in the collecting tank once each day, and all parts of the booth are thoroughly cleaned once a week. * * *

Diagram shows arragement of facilities in United Gas' Houston division meter shop.



PLAN OF HOUSTON METER SHOP

From a few feet to MANY THOUSANDS



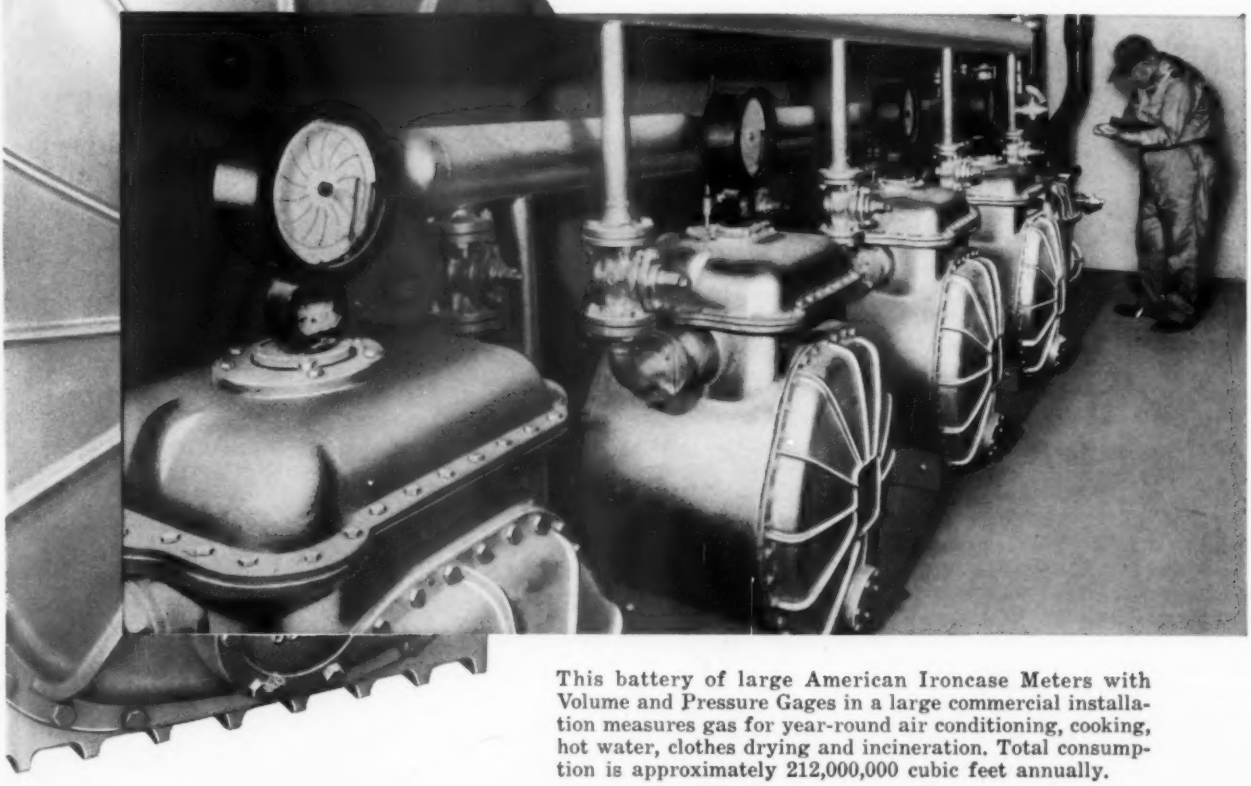
LONG-LASTING ACCURACY IS ASSURED WITH AMERICAN® IRONCASE AND ALUMINUMCASE METERS

With American Meters on the job both the gas company and the consumer are sure of precise measurement accuracy under all conditions year-in-and-year-out.

When the measurement job is a big one, American Ironcase or Aluminumcase Meters are the logical choice. Demand rates and variations in pressure are measured and recorded with these high pressure meters equipped with Volume and Pressure Gages. For measurement with varying pressure and temperature, American Base Pressure and Base Volume Indexes continuously indicate gas volume at base conditions.

American 80-B, 250-B and 500-B Meters are supplied in Ironcase and light weight Aluminumcase models for operating pressures to 100 psi.

Write now for full information.



This battery of large American Ironcase Meters with Volume and Pressure Gages in a large commercial installation measures gas for year-round air conditioning, cooking, hot water, clothes drying and incineration. Total consumption is approximately 212,000,000 cubic feet annually.

AMERICAN® METER COMPANY
INCORPORATED (ESTABLISHED 1836)

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Albany • Alhambra • Atlanta • Baltimore • Birmingham
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Modern Methods of Service Request Dispatching - 2

FIG. 1. **General layout of dispatch center.** At right are land phone operators taking extended reports from the field. Just behind this group are distribution file maps. At right rear are compartments for distribution of next day's work by district and section. At left are three radio dispatching booths. At rear center is a door from the order-taking department.

FIG. 2. **Overhead view** showing radio operation bench separated into three booths by acoustic tile lined partition.

Radio Speeds Dispatching for Michigan Consolidated

J. L. Joachim

Superintendent, Service Shop
Michigan Consolidated Gas Company
Detroit, Michigan

PRIMARY OBJECT of this article is to describe facilities and their operations that Michigan Consolidated Gas Company dedicates to transmitting service and meter orders to the field personnel for completion on the same day they are received by the order taking department. The Detroit district of Michigan Consolidated Gas Company serves more than 680,000 customers in an area covering 506 sq miles. There are over 360,000 customers using gas for space heating.

The dispatching load during the winter months on the day shift varies from 1500 to 2700 orders; on the evening shift from 600 to 1000 orders and on the midnight shift from 85 to 190 orders. In the summer months, the day shift load varies between 1000 and 1700 orders; the evening shift load between 350 and 550 orders, and the midnight shift load betwen 20 and 60 orders.

The daily work load in the service department is developed by the number of customer calls received for the following classes of service as outlined in the company service policy bulletin. The service policy provides time commitments for the various requests as follows:

Same day order service

Dispatched to be executed as soon as possible.

1. Leak order.
2. Emergency.
   a. Fire.
   b. Explosion.

Dispatched to permit execution within a three-hour limit.

1. Space heating—no heat.
2. Space heating—over heat.

EDITOR'S NOTE: This is the second of four articles on Modern Methods of Service Request Dispatching. Part 1 appeared in the October issue. Part 3 will appear in the December issue and Part 4 in the January issue.

Dispatched to permit execution same day as received.

1. No hot water.
2. No refrigeration.
3. Dryer orders.
4. Space heating adjustments.

Next day order service

Distributed in loads for each field section.

1. All appliance adjust orders except complaints of space heat, no heat or over heat, or no refrigeration, no hot water and dryer requests which are "Same Day Orders."
2. All meter orders.
3. All other customer service requests such as extend meter manifold, change position of meter, etc.

FIG. 3. **Leak or emergency orders.** This type of order is time stamped by the messenger as it is relayed to the order receiving clerk for dispatching.

FIG. 4. **Order receiving clerk.** As the orders are received for dispatching the clerk places them in the proper slot on the conveyor belt for delivery to the booth which is in contact with service vehicles in the area.

Any of the orders normally committed for "Next Day Service" may be dispatched for same day execution upon customers' insistence and shall be authorized by a supervisor of the department in which the orders originate.

Full eight-hour shifts are only used in service shop manpower assignments. Partial day routes are not in use. Starting work load assignments vary from full-day work loads for those men not reporting to the dispatchers to one or no orders for those men reporting every 42 minutes to pick up leaks.

Flexibility in order loading to provide handling of urgent orders is accomplished by starting the servicemen in radio equipped vehicles with fill-in type orders of routine nature, such as time meter changes, meter investigations, etc. As these servicemen contact the dispatch board, according to schedule, by paging, or selective radio signals, orders of an urgent nature are dispatched for execution as soon as possible.

Peak loads that develop as a result of weather conditions or seasonal variations may be forecast by previous experience and past records. Manpower is scheduled to meet the anticipated work load. Any work in excess of capacity in available manpower is carried over into the following work shift and is generally performed by men working overtime.

The daily line-up of field manpower is determined by the dispatch board based on experience by previous work loads. A minimum field force for winter operations was placed in effect in September 1956, and continued until April 1957. Additional men are placed in the field as the need warrants and the work force is built from this minimum.

The winter minimum force reporting to the dispatch board consists of:

Monday through Friday (except Holidays)

Day Shift—
- 180 men (leak and appliance adjustments).
- 21 two-man repair crews.
- 21 one-man appliance repair crews.

Afternoon Shift—
- 68 area men.
- 7 two-man repair crews.

Midnight Shift—
- 7 two-man crews.
- 4 hotel crews.

Saturday

Day Shift—
- 160 area men.
- 7 two-man repair crews.

Afternoon Shift—
- 69 area men.
- 4 two-man repair crews.

Midnight Shift—
- 7 two-man crews.
- 4 hotel crews.

Sunday

Day Shift—
- 65 area men.
- 4 two-man repair crews.

Afternoon Shift—
- 34 area men.
- 2 two-man repair crews.

Midnight Shift—
- 7 two-man crews.
- 4 hotel crews.

In addition to the above schedule, two emergency crews of two men each with radio and police siren equipped cars are available on all shifts every day of the year.

Long-range manpower requirements are predicted on budget data. Excess seasonal manpower is absorbed by scheduling vacations and meter time change orders. Little or no exchange of personnel occurs between departments to accommodate seasonal variations in manpower requirements. Unforeseen seasonal demands are met by overtime work.

Dispatching Center

The dispatching center is located in a room 17 ft by 60 ft. The general layout is portrayed in Fig. 1. On the right are land phone operators taking extended reports from the field. Just behind this group are distribution file maps. In the rear on the right are compartments for distribution of next day's work by district and section. On the left are three radio dispatching booths. In the center at the rear is a door from the order taking department. Not shown in Fig. 1, but a little to the left from the approximate location where the picture was taken is a desk for a clerk and one for a supervisor.

Nerve center of the order dispatching operation is the radio communication system. The whole operation is centered about communication over three radio channels, 451.25 mc, 451.05 mc and 158.19 mc, allocated to service shop department use.

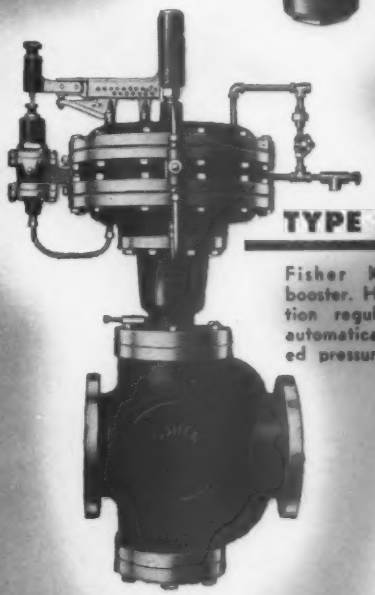
Physical layout of the dispatch board is the result of evolutionary development from telephone contact only to nearly 100 percent radio equipped vehicles and the subsequent changes necessary to accommodate these development processes. The existing facilities have been in operation since September 1956, and adequately fulfills our dispatching needs.

The radio operations bench is built on a base 35 ft long and 4 ft wide. The bench is divided into three booths by 5-ft high partitions lined with acoustic tile to reduce background noise (Fig. 2).

FISHER® Offers Most GAS

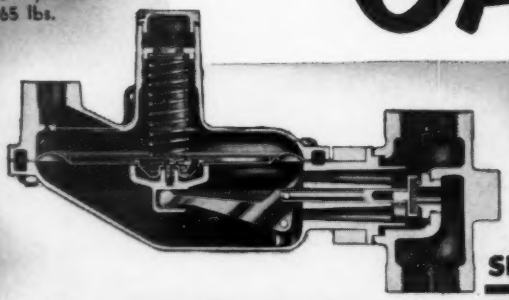
TYPE 99

Self-contained pilot operated gas regulator for small border stations and industrial applications. 2" size only. Reduced pressure range 4 oz. to 65 lbs.



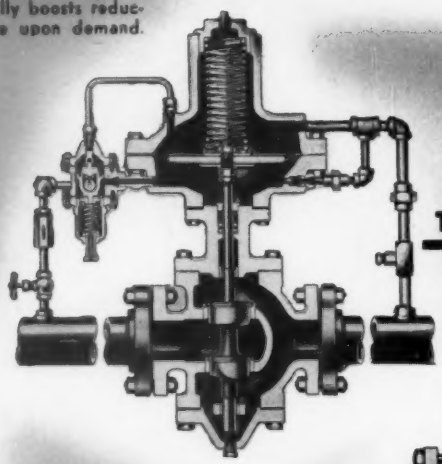
TYPE 840

Fisher King pressure booster. High pressure station regulator unit which automatically boosts reduced pressure upon demand.



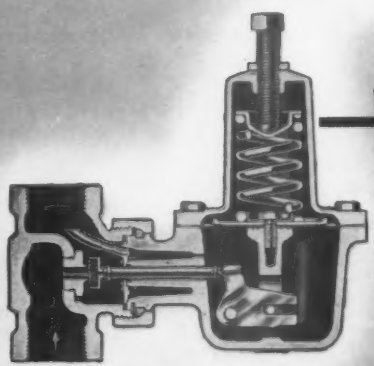
SERIES S100

Standard gas service regulator with or without integral relief valve, bug-proof vents. Also available with safety shut-off feature. Sizes ¾", 1", 1¼" and 1½".



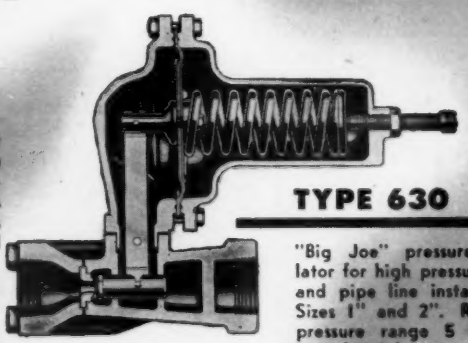
TYPE 880

Pilot loaded, pressure balanced high pressure station regulator, ideal as town and border station regulator for dependability and stable metering. Pressures to 600 psi inlet, 250 psi outlet. Sizes 2" to 10", iron or steel.



TYPE 620

Pounds to pounds regulator especially suited for first stage reduction on farm taps. Also designed for industrial gas applications where good regulation is required. Sizes ¾", 1" and 1¼".



TYPE 630

"Big Joe" pressure regulator for high pressure field and pipe line installations. Sizes 1" and 2". Reduced pressure range 5 to 200 pounds. Inlet pressure up to 1500 lbs.

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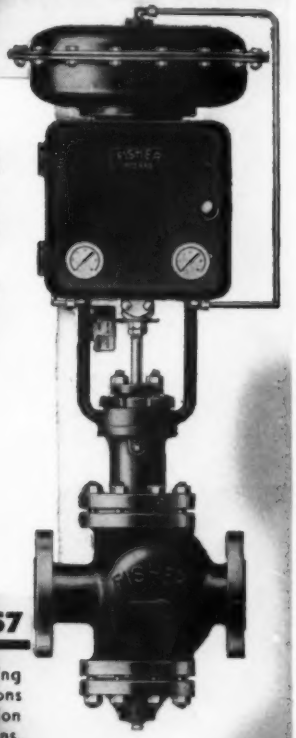
LEADS THE INDUSTRY IN RESEARCH
FOR BETTER GAS PRESSURE CONTROL

You The Industry's *Complete* Line of REGULATORS

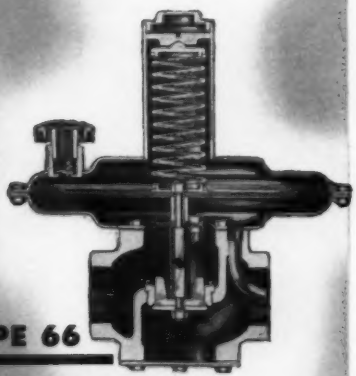


Fisher Governor Company's wide variety of regulators handle control applications ranging from the natural gas well head to burner utilization. Illustrated are just a few of the varieties of construction.

This complete Fisher line of regulators for the gas industry includes District Regulators, high, low and intermediate pressure —Distribution Regulators—House Service Regulators—High Pressure Field Regulators—Boiler Gas Fuel Governors—Booster Regulators—Safety Shut-Off Regulators—Town Border Station Regulators—Industrial Gas Regulators—Meter Run Regulators.

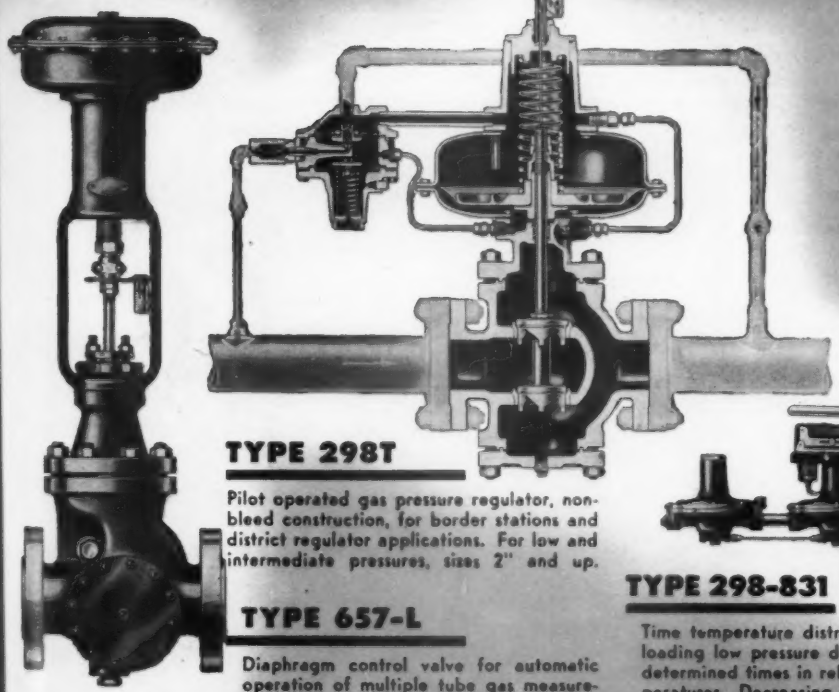
TYPE 4100U-657

High pressure reducing valve for border stations — high pressure regulation and industrial applications.



TYPE 66

Low pressure sensitive industrial regulator for inlet pressures up to 5 lbs. Reduced pressure "WC to 1 lb. Sizes 2", 3", 4".

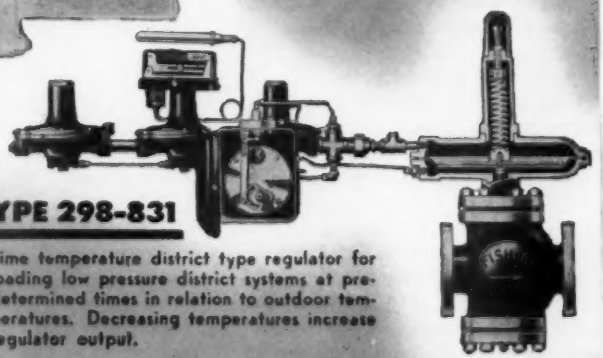


TYPE 298T

Pilot operated gas pressure regulator, non-bleed construction, for border stations and district regulator applications. For low and intermediate pressures, sizes 2" and up.

TYPE 657-L

Diaphragm control valve for automatic operation of multiple tube gas measurement meter runs. Features extremely low pressure drop and tight shut-off.



TYPE 298-831

Time temperature district type regulator for loading low pressure district systems at predetermined times in relation to outdoor temperatures. Decreasing temperatures increase regulator output.

FISHER GOVERNOR COMPANY

MARSHALLTOWN, IOWA • WOODSTOCK, ONTARIO

FIG. 5. **Booth No. 2.** This booth is equipped with three radio operating positions and one telephone position in contact with the three western districts of the area.

At the head of the bench the order receiving clerk receives the service request orders (Fig. 3) and passes them to the proper dispatching booth by a conveyor belt system (Fig. 4).

Each booth operates on a different radio channel controlling service trucks from eight service shop districts throughout the metropolitan area of the city. Booth 1 is equipped with two operating positions in contact with approximately 80 vehicles from the two eastern districts. Booth 2 is equipped with three operating positions in contact with approximately 90 vehicles from the three central districts. Booth 3 is equipped with two operating positions in contact with approximately 70 vehicles from the three western districts (Fig. 5).

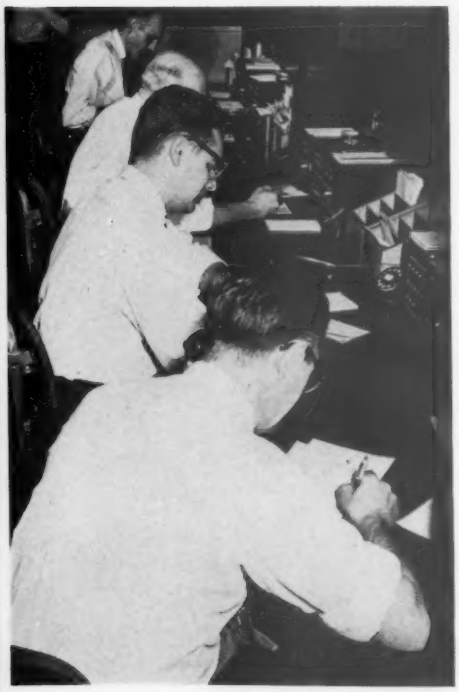


FIG. 6. **Telephone reporting positions.** Six telephone instruments connected to the outside and inter-company lines provide a means for the serviceman to relay information back to the dispatch center in the event of questions, referred orders, or need for additional information.

Service Districts

Each of the eight service shop districts is subdivided into sections. The number of sections in each district varies from one to five depending on the geographical size of the area encompassed by the district. Each section is further divided into two areas.

In each section, three radio equipped vehicles designated as "Minute Men Cars" report to the dispatch board on a 42 min call-in schedule—these handle leak orders. In addition, each section has four area radio equipped cars on a two-hour call-in schedule handling no gas, no heat, no refrigeration and special orders.

Divided among the 31 sections, there are 21 appliance repair men and 21 two-man repair crews which call in approximately four hours after starting but are available for call on the selective calling radio signal light. In addition to this force, 30 vehicles in the field equipped with selective calling signals are available to the dispatch board for service in case of emergency.

In addition to the microphone positions, a telephone is available in each booth. The telephone position is used to accommodate those vehicles not equipped with radios which may call the dispatcher for orders during peak periods. This position is also used in the event of radio equipment failure in the vehicles or at the base station. The men on radio with those men reporting by telephone on peak days give a total reporting force of approximately 225 men available to the dispatchers on a normal winter day and approximately 275 on a peak winter day during the day shift.

Radio Dispatching

Radio dispatching booths serve as a means of communication from the dispatch board center to the serviceman. Their use is limited to outgoing information only. Questions or discussion on any order beyond clarifying order information are not carried on over the air. This is necessary to prevent tying up the radio channel and disrupting call-in schedules. For information from the serviceman to the dispatch board, such as deferred orders, work referred to other departments, etc., a telephone reporting section has been established (Fig. 6). Six telephone instruments connected to 20 inter-company and outside lines through keyboard boxes serve this purpose.

This system of order dispatching can handle an average load of 3250 orders for a 24-hr period. Peak loads of 6000 orders have been handled in a 24-hr period through radio and telephone facilities.

Order loads are composed of various types of orders depending on the work classification of the serviceman. An average evaluation of time based on previous elapsed time surveys is placed on various types of orders and average work loads are set up or dispatched to allow for travel and C.G.I. time.

The method of handling customer inquiries concerning unexecuted orders or those in process consists of originating a tracer order, known in Detroit as a "Shop Notify." If the original order cannot be located in time to fulfill the original commitment, the tracer may be dispatched as a duplicate of the original order.

Repeat calls are identified by information records on the master customer service file. Such orders are identified as chronic and are referred to the service shop foreman for follow-up and disposition.

Uncompleted dated orders at the close of the day shift are executed by the following shift that same day or with men on overtime and do not become a "Did Not Get To" order if a commitment has been made. ★ ★ ★

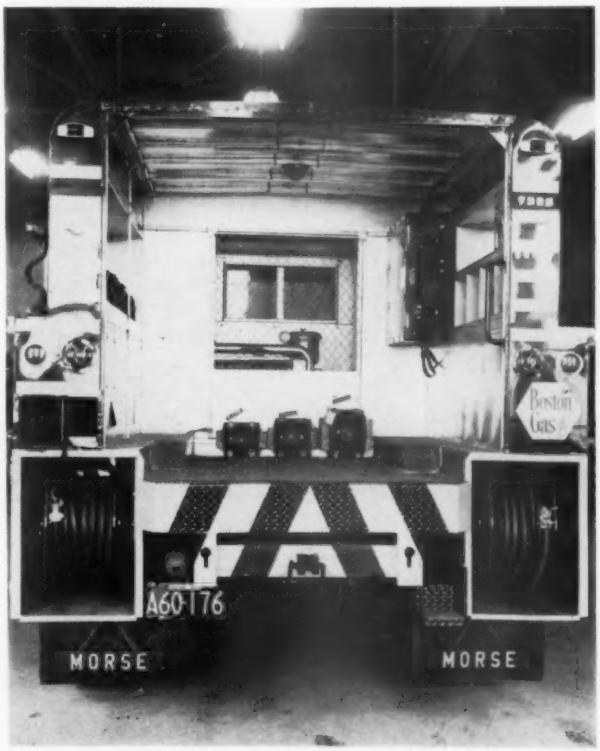
One of the new compressor trucks in action repairing gas main in residential area.

New Compressor-Equipped Trucks Help Improve Service Operations

SEVEN NEW COMPRESSOR-EQUIPPED TRUCKS, first units of a 40-vehicle service fleet, have recently been put into operation by Boston Gas Company. By the end of 1957, 21 of the new trucks are expected to be "on the line," with the remaining 19 trucks scheduled for delivery by the end of 1959.

Each of the cab-over-engine type trucks is equipped with a 105 cu ft per min air compressor operating through a power take-off. Other equipment on the 154-in. wheelbase vehicles includes two hose reels, blower type gas mask, 140 miscellaneous items of tools and equipment, and 62 items of standard stock. Total vehicle weight completely equipped is approximately 13,000 lb.

Rear view of Boston Gas Company compressor trucks shows the compact interior compartments for the storage of tools and equipment. Also shown are the two conveniently located hose reels situated on either side of the truck body behind the rear wheels.



Each truck is equipped with a 2-way radio arranged so that the dispatcher can summon the driver's attention by sounding his truck horn. This permits keeping radio volume low when left on to receive calls, thus avoiding annoyance to the public.

Operation of the "quick call" device is by a radio pulse, or audible tone, from the central dispatching office. Each vehicle is assigned a separate tone to which it alone responds. In operation, the dispatcher calls a specific truck by pressing the corresponding numbered button on his console.

The truck radio, left on at minimum volume with the horn relay in operation, receives the tone and if it is the assigned vehicle, the horn relay is activated, "honking" the horn. The horn relay can be voided by a switch to prevent operation when not wanted —as when the volume is turned up and truck is being operated in traffic.

Bodies of the vehicles include crew

On the Line. Seven new Boston Gas Company compressor trucks are shown parked in formation before departing for a day's activity in the field. Vehicles are equipped to remain on the job all day, handling any street division requirement and are dispatched from one assignment to another by a 2-way radio call system.

New Boston Gas Company Compressor Trucks. Vehicles are equipped with paneled exterior compartments for efficient storage of tools and equipment. Side door behind cab serves as entrance to the heated crew compartment.

compartments, which are heated by the truck engines. Drinking water containers as well as folding tables are provided, allowing crews to eat their lunches in comfort during cold seasons.

Standard design bodies with minor alterations to meet Boston Gas requirements have been used. Details on the new units were worked out by W. C. McNeill, transportation supervisor, assisted by G. H. Peachey, Jr., and C. G. Young, street division superintendents.

Use of the new service vehicles has speeded up service by providing crews with more efficient tools and the power to operate them, while reducing waiting time and truck mileage. Dispatchers have better control, can schedule work more efficiently, and the units are always ready to handle emergency jobs. ★ ★ ★

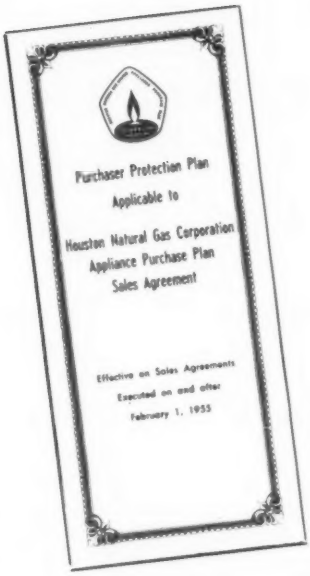
Columbia Gas System Service Corp. Opens New Building

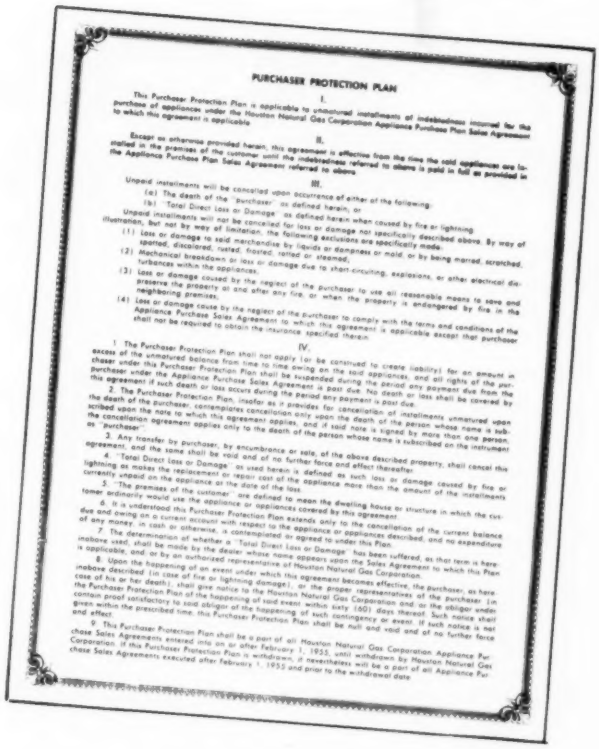
COLUMBIA GAS SYSTEM SERVICE CORPORATION has opened a new $1½ million, two-story building on a 15-acre site in Columbus, Ohio, that will serve as a vital spot in Columbia Gas System operations over a seven-state area including Ohio, Pennsylvania, West Virginia, Virginia, Kentucky, Maryland, and New York.

The Service Corporation, a subsidiary of the Columbia Gas System, does engineering, research, and other services for operating companies in the system.

Key system offices are in the new Columbia building and many of the functions important to system-wide operation will be carried on in the building. Housed in the new building is the system's network analyzer, an "electronic brain" that automatically analyzes systems and determines necessary pipe sizes, pressures, etc.

A centralized billing department, where billing of the 1,300,000 retail customers of the Columbia Gas System will eventually be handled, is also located in the Service Corporation building. A modern brick structure, completely gas air conditioned, it provides space for about 200 employees who have been working in various locations in the Columbus area. Ample parking space is provided adjacent to the building.





Copy of plan, mailed each customer after utility has purchased paper from dealer, outlines how the Purchaser Protection Plan works.

Kenneth C. Reed,
Regional Manager
Sales Promotion
Houston Natural Gas Corporation
Houston, Texas

Purchaser Protection Plan Pays Profits, Builds Business

WITH MORE AND MORE GAS UTILITIES entering the field of retail appliance financing, methods of increasing the volume of business in order to reduced the fixed cost per contract are becoming increasingly important.

A unique method of increasing the volume of paper handled, and at the same time creating customer good will, has been developed by Houston Natural Gas Corporation of Houston, Texas, a pioneer in retail financing.

Called the *Purchaser Protection Plan*, the device was conceived by Houston Natural's vice president in charge of sales, Proctor Thomas.

The plan provides for mortgage cancellation in the event of death of the purchaser or destruction of the appliance by externally-caused fire or lightning (who ever heard of lightning striking a GAS appliance?). Delinquent accounts are excepted.

Normally, when a customer finances an appliance with a bank or similar institution, he is expected to maintain his own insurance on the appliance. And of course, the customer is expected to maintain adequate life insurance so that his heirs will be able to settle his debts.

How the Plan Developed

The simple fact, however, is that a large number of appliance purchasers are not adequately insured. A case occurred in Houston Natural's service area where a financed appliance was destroyed by fire, and the customer refused to continue paying for it. Because the contract was in recourse, the dealer was asked by Houston Natural to repurchase the contract. This sequence of events resulted in considerable ill will against the utility on the part of both the customer and the dealer.

Houston Natural subsequently began investigating the possibility of insuring appliances financed through its Appliance Purchase Plan. An insurance company was approached, and offered to carry insurance for a consideration of one percent of the volume.

Thomas felt that Houston Natural would do better to carry its own insurance, and the record has proved his decision to be correct.

Beginning February 1, 1955, the company began offering, at no increase in cost, insurance against loss resulting from death of the purchaser or destruction of the appliance by external causes.

How It Has Worked

Company officials held their breaths when just two months later, in May 1955, the Purchaser Protection Plan cancelled its first mortgage, in the amount of $209.88. The cancellation resulted from the death of a lady who had purchased a Servel refrigerator and had made only two payments on it prior to her death.

A 27-month review of the plan, however, has shown that the losses have been less than 0.2 percent. From February 1955, through May 1957, a total of 22 mortgages in the amount of $3556 were cancelled. During that period, $1,815,387 worth of paper was purchased from dealers.

Incidentally, all losses to date have occurred from deaths of purchasers. There have been no losses caused by destruction of the appliance.

Plan Brings in Business

In spite of the indicated inexpensiveness of the plan compared to the total volume of business, there remain only two important justifications for the continued use of the Purchaser Protection Plan — *as a public relations gesture,* and *as a means of bringing in business.*

BURNER TIPS

HOUSTON NATURAL GAS SYSTEM

HOUSTON, TEXAS | VOLUME 21, NO. 6 | JUNE, 1957

Purchaser Protection Plan Pays Off!

22 Mortgages, $3556 Cancelled by Plan

Since its inception on February 1, 1955, Houston Natural's Purchaser Protection Plan has cancelled 22 mortgages in the amount of $3556!

The Plan provides that when a purchaser dies, or an appliance is destroyed by externally-caused fire or lightning, the unpaid balance is cancelled. This applies on all appliances financed through Houston Natural by co-operating dealers.

The Purchaser Protection Plan, thus, is an important sales tool to help you in closing sales. Most financial houses require the customer to maintain insurance on the appliance.

It is a protection to you as a dealer, also, because delinquent accounts resulting from these causes within the recourse period would otherwise have to be paid by the dealer.

Here are the claims which have been paid by the Plan:

Dealers are kept informed of Plan's effectiveness through articles in the utility's monthly paper to dealers, "Burner Tips."

Mrs. Dorothy Mae Stahl
1205 North Tinsley Street
Angleton, Texas.

Dear Mrs. Stahl:

We of Houston Natural Gas Corporation would like to take this opportunity to offer our condolences in your recent bereavement.

As executrix of the estate of Mr. Stahl, you will be interested to know that the Hotstream Water Heater which Mr. Stahl purchased on December 20, 1955, from Angleton Lumber Company and financed through our Appliance Purchase Plan is covered by our Purchaser Protection Plan.

The death certificate shows that Mr. Stahl passed away February 21, 1957. Under our Purchaser Protection Plan the $25.80 remaining unmatured balance due is cancelled. Thus, the note and chattel mortgage signed by Mr. Stahl at the time of his purchase is cancelled and attached to this letter.

Yours very truly,

P. A. DuChesne
Credit Manager

PADime

cc: Angleton Lumber Company

Copy of letter sent to family of deceased in whose name appliance was purchased and "insured" under the Plan.

The public relations value is obvious. It is extremely unpleasant, and frequently embarrassing, for a utility to have to make a repossession from a family that has suffered bereavement or whose home may have been destroyed by fire.

To the question, "Does the Plan bring in business?" no definite answer can be given. Houston Natural does not advertise its *Appliance Purchase Plan* with the corollary *Purchase Protection Plan* very extensively, so that the only advertising the customer receives prior to purchasing is by word of mouth from the dealer.

After the customer has made his purchase, and the paper has been bought by the utility, the customer is mailed an outline of the Purchaser Protection Plan. By this time, however, he has already made his selection of a financing agency.

There are only two ways of insuring that such a plan induces people to finance with the utility:

1. That the utility advertises the existence of protected coverage.

2. That the dealer is constantly reminded to inform his customers — prior to signing the contract — that all contracts entered into with the utility are protected.

It has been noted that Houston Natural does not advertise its plan. The alternative, therefore, is to remind the dealer constantly to inform his customers of the protection offered when the customer elects to finance with the utility.

This is done at Houston Natural by direct mail pieces sent to dealers from time to time, by personal reminder from dealer contact personnel, and by featured coverage in the utility's magazine for dealers, *"Burner Tips,"* whenever a mortgage is cancelled by the plan.

Plan Is Effective

A Purchaser Protection Plan can be an effective way of creating good dealer and customer relations, and of increasing the volume of appliance financing. Any gas utility desiring to increase its volume would do well to investigate the possibilities, remembering that the plan produces best results when it is well publicized. ★ ★ ★

Mechanics of Houston Natural's Purchaser Protection Plan are quite simple:

1. The customer is notified at time of purchase of the provisions of the Plan. This is done by mailing him an outline of the Plan.

2. The customer is expected to notify Houston Natural of his eligibility for benefits.

3. When the customer furnishes the utility with a death certificate, or a utility investigator determines that an appliance has been destroyed by external causes, the mortgage is returned to the customer by the credit department. The utility must be notified within 60 days of the purchaser's death or destruction of the appliance.

4. Mortgage cancellations are charged to a 10 percent reserve fund, which is set aside to cover all losses. Houston Natural's losses caused by repossession, incidentally, account for 0.5 percent of the volume.

THIS CHAPTER TO BE FILED UNDER: **Natural Gas**

American Gas Fundamentals

A Continuing Educational and Refresher Course in Gas Technology, Management, Equipment, Operations, and Utilization

Gas Calorimetry

Part 1 — The Importance of Heating Value Measurement

This chapter—in three parts—discusses the importance of the accurate determination of gas heating value, one of the two major quantities involved in the measurement of energy, the product of the gas industry. Definitions are given of fundamental terms used in gas calorimetry including the standard cubic foot. In actual practice, a wide variation is encountered in this term because of the conditions of pressure, temperature, and saturation established by local standards.

A review of the gas laws governing the quantity of gas in a cubic foot is made for the purpose of calculating factors that can be applied to the total heating value per cubic foot at 30-in. of mercury at 60 F, saturated to obtain results at any other base.

Fundamental principles of operation of the more important and also the lesser known calorimeters and instruments for the determination of heating value are briefly described. Their principles are considered from the standpoint of fundamental terms.

Finally, a comparison of the two most generally used gas calorimeters — the manually operated water flow type and the Cutler-Hammer recording type — is made. The fundamental measurements, calculations, and essential problems encountered in making the heating value determination with each instrument are enumerated.

Energy

Energy, available in large quantities and in a convenient, usable form, has been the impetus for the material and economic development of civilized life. As man accumulated knowledge, he harnessed the natural sources of energy and then controlled them to do useful work. Heat, a transient form of energy is a most useful source.

The gas industry is one of the largest in this country and one of the most important sources of energy — particularly heat energy. Statistics of the industry show all-time highs; thousands of miles of mains, millions of customers served, billions of dollars invested, and trillions of cubic feet sold. These facts are known, but are not generally understood. It may not be so well known that natural gas has been used by man for many centuries.

The Oracle at Adelphi in ancient Greece came into being as a result of natural gas. The story is told that a shepherd, tending his flocks, noticed that some of the animals behaved in a strange manner when grazing in a certain area. He found on going to the area that he became affected by some invisible power which seemed to come from a chasm in the ground. His friends on entering the area became talkative and lightheaded. It was agreed that this was evidence of some supernatural agency and that some sort of god lived there. Later a temple was erected on the spot within which a priestess sat on a tripod over the chasm. Vapors arose causing her to utter strange words that were interpreted by prophets into messages for the people.

The ancients of western China made what is considered the first commercial use of natural gas. They obtained gas from salt wells, nearly two thousand feet deep, transported it through bamboo pipes and used it to evaporate brine.

This source of energy was "christened" by one of the last of the medieval alchemists. About 1609, John Baptist Von Helmont of Brussels reported the discovery of artificial gas, better known today as manufactured gas. In some of his experiments with various metals he discovered they yielded what he described as a "wild spirit." He said, "This spirit, up the present unknown, not susceptible to being confined to vessels, nor capable of being produced in a visible body, I call by the name of gas." This word gas was derived from a Greek word meaning "spirit," "ghost," or "mystery." Thus, in its christening this source of energy retained its psuedo-supernatural character associated with its original discovery. Nearly 200 years later William Murdock took practical steps to harness this spirit, and make it serve a useful purpose.

Measurement and Control

To the engineer this brief history can be characterized by the absence of two important factors: *Measurement* and *control*. The development of the present-day gas industry has certainly been the result of the ease and simplicity of the control of the energy in its product. It has been said that if a quantity can be measured it can be controlled.

Measurement is actually a comparison. It consists of comparing things that we know less about with things that we know more accurately. It might be called comparing the unknown with the known.

Thus, all measurement is comparison, and since we must compare with some other thing, all measurement is, therefore, retroactive. The instrument that is used to measure another thing is itself being checked.

Insofar as the gas industry is concerned economically, energy is another way of saying dollars. Buying and selling gas means trading energy and dollars. The measurement of this energy involves two quantities — volume and heating value. The volume in the English system of units is expressed

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in *cubic feet* and the heating value in *British thermal units* per cubic foot.

Importance of Heating Value

The two measurements of volume and heating value are indispensable in order to define correctly the amount of energy being purchased, conditioned, improved, and delivered. The *National Bureau of Standards Circular No. 405, "Standards of Gas Service"* states:

"If potatoes are quoted at a dollar per sack, the statement is significant only to one who understands whether a sack holding 10, 50, or 100 pounds is meant. Just so, the volumetric rate (the price per hundred or per thousand cubic feet) at which gas is sold means nothing unless the heating value of the gas is specified or understood."

The meaning of standards of gas service, as outlined by the National Bureau of Standards, is in agreement with the objectives of the industry and includes the following:

"A city gas supply is a supply of energy in a form that is always available, easily controlled, and easily conveyed to a desired point and there converted into heat. It can be nothing more and should be nothing less than this. The conditions which are essential to good service are therefore easily defined. They consist merely in making the supply of energy available in sufficient quantity at all times to all parts of the territory served by the company under conditions which permit its satisfactory control; in correctly measuring the energy sold to each customer, and in giving the customer such information and assistance as will enable him to use the supply with safety and satisfaction . . ."

It is, therefore, obvious that all aspects of the industry; accounting, economic, legal, and service, require accurate and reliable measurements of heating value.

At this point it would be well to remember that a unit of energy called a therm is also used. A therm is 100,000 Btu. It represents a combination of heating value and volume, e.g., 100 cu ft of a gas with a heating value of 1000 Btu per cu ft is one therm. Similarly, 40 cu ft of propane vapor at 2500 Btu per cu ft is also one therm.

Gas Calorimetry

The instrument by which the measurement of gas heating value is made is called a *calorimeter*. In order to understand the fundamentals involved in the measurement, it is desirable to define properly the important terms. These definitions are taken from the *American Society for Testing Materials, Standard D900-55, Test for Calorific Value of Gaseous Fuels by the Water-Flow Calorimeter.*

Definitions

Standard cubic foot of gas is the quantity of any gas that at standard temperature and under standard pressure will fill a space of one cubic foot when in equilibrium with liquid water.

Standard temperature is 60 F, based on the international temperature scale.

Standard pressure is the absolute pressure of a column of pure mercury 30-in. in height at 32 F and under standard gravity (32.174 ft per sec per sec).

British thermal unit, or **Btu,** is the quantity of heat that must be added to one avoirdupois pound of pure water to raise its temperature from 58.5 F to 59.5 F under standard pressure.

Total calorific value (total heating value) of a gas is the number of British thermal units evolved by the complete combustion, at constant pressure, of one standard cubic foot of gas with air, the temperature of the gas, air, and products of combustion being 60 F and all of the water formed by the combustion reaction being condensed to the liquid state.

Net calorific value (net heating value) of a gas is the number of British thermal units evolved by the complete combustion, at constant pressure, of one standard cubic foot of gas with air, the temperature of the gas, air, and products of combustion being 60 F and all of the water formed by the combustion reaction remaining in the vapor state.

Theoretical air is the volume of air that contains the quantity of oxygen, in addition to that in the gas itself, consumed in the complete combustion of a given quantity of gas.

Excess air is the quantity of air passing through the combustion space in excess of theoretical air.

Combustion air is the air passing into the combustion space of the calorimeter (theoretical air plus excess air).

Products of combustion are all substances resulting from the burning of gas with its theoretical air, including the inert constituents of the gas and the theoretical air, but excluding excess air.

Fuel gases are the products of combustion remaining in the gaseous state together with the excess air.

The following terms are also frequently encountered in a study of gas calorimetry:

Specific heat is the number of Btu required to raise the temperature of one pound of any material 1 F.

Heat capacity of a gas is the number of Btu required to raise the temperature of one standard cubic foot of gas 1 F. (NOTE: The heat capacity of a gas depends slightly on gas composition and temperature but is substantially unaffected by pressure.)

Standard Cubic Foot

The definition given previously according to Dalton's law is equivalent to stating that the partial pressure of the gas is: 30 – 0.522 = 29.478-in. of mercury column. In simplified form the basis of measurement for the standard cubic foot is usually written, 30-in. Hg — 60 F — Sat.

Although the standard cubic foot has been defined in the foregoing, it is by no means universally used by the gas industry. There are a number of standards employed which may differ from the definition in any or all of the three factors; pressure, temperature, and saturation. Apparently, the variations have been introduced in an effort to make the basis of measurement correspond to average conditions existing at the meter of the ultimate domestic consumer. There appears on Page 5 of Standards of Gas Service Circular 405, the following:

"The designation of 60 degrees F as the temperature to which the volume of gas will be reduced is an inheritance from the past, and represents the assumed average temperature at the places of installation of gas meters in Great Britain. It is a temperature base used only in connection with the public supply of fuel gas and has nothing to recommend it except its tradition and general use for this purpose. The correction of the observed barometric column to standard gravitational force and the temperature of 32 degrees F, simply places the measurement of the pressure on the basis employed in other technical work."

Because of the wide variation in these standards, it will be desirable to consider the correction factors necessary to change the volume measured at standard conditions (30-in. Hg — 60 F — Sat.) to the special conditions. In this connection a review of the fundamental gas laws is in order.

Consider first of all the cubic foot. This can be represented by a box with one foot for each of its dimensions. The quantity of gas and, hence, the number of Btu that the box will hold will depend upon the pressure, temperature, and degree of saturation (water vapor present).

Let us first examine the effect of water vapor on the num-

er of Btu. According to Dalton's law, each gas in a mixture exerts a partial pressure equal to that pressure which the gas would exert if the same weight that is present in the mixture were present alone in the volume in question. Thus, we can consider the material occupying the cubic foot as consisting of two parts, gas and water vapor, each separated from the other. On this basis, it is apparent that the space occupied by water vapor displaces gas and consequently reduces the number of Btu in the cubic foot. Therefore, in the case of the standard cubic foot where the total pressure is 30-in. of mercury and the temperature is 60 F under the saturated condition, the vapor pressure of the water vapor is 0.522 inches of mercury. As was indicated previously, this gives a partial pressure for the gas of $30 - 0.522 = 29.478$ in. of mercury.

On the basis of Boyle's law, the amount of gas in the cubic foot varies directly with the absolute pressure. Thus, if the gas pressure in the one cubic foot box decreases, less gas or a smaller number of Btu will be in the box.

Similarly, on the basis of Charles' law, the amount of gas in the cubic foot box varies inversely with the absolute temperature. If the temperature of the box increases, less gas or a smaller number of Btu will be in the space.

These three factors can be combined into "The gas volume factor" which we will call F. The general formula can be written

$$F = \frac{(P - V_t)\ (60 + 459.7)}{(30 - 0.522)\ (t + 459.7)}$$

Where: F = Factor by which results at standard conditions of 30-in. Hg — 60 F — Sat. must be multiplied to convert to the new pressure and temperature base.

P = Total pressure of the cubic foot in inches of mercury.

V_t = Vapor pressure in inches of mercury of water vapor at temperature t.

t = Temperature of cubic foot in degrees F.

60 = Standard temperature F.

459.7 = Absolute temperature corresponding to 0 F.

0.522 = Vapor pressure of water vapor in inches of mercury at 60 F.

Fig. 1 gives a tabulation of the factor F for a number of standard conditions which are employed in this country.

The following examples will serve to illustrate the use of the formula:

Problem 1: Determine the volume correction factor for a standard cubic foot at 30-in. of mercury, 60 F and dry.

$$F = \frac{(30 - 0.0)\ (60 + 459.7)}{(30 - 0.522)\ (60 + 459.7)} = 1.0177$$

In this case, $V_t = 0.0$ since with no water vapor present the vapor pressure must be zero. Since the factor is greater than one, more gas will be in the box and consequently more Btu. It is also apparent that more gas must be in the dry cubic foot since the partial and total pressure of the gas is 30-in. of mercury.

Problem 2: Determine the volume correction factor for a standard cubic foot at 14.90 psi, 60 F and saturated. From the data at the bottom of Fig. 1

30-in. Hg = 14.735 psi

V_t = 0.256 psi

and

$$F = \frac{(14.90 - 0.256)\ (60 + 459.7)}{(14.735 - 0.256)\ (60 + 459.7)} = 1.0114$$

These gas volume correction factors can be used to calculate the heating value per cubic foot at conditions other than standard. For example, if the heating value of a natural gas is 1028 Btu under standard conditions of 30-in. Hg — 60 F — Sat.; the heating value under the special condition of 30-in. Hg — 60 F — Dry will be 1028 times 1.0177 = 1046 Btu.

An illustration of the effect of expressing heating value per cubic foot in terms of "as is" conditions can be secured by calculating the heating value per cubic foot in a certified cylinder of methane. Assume the following:

Cylinder pressure = 2000 psig;

Temperature = 60;

Gas will be dry;

Certified heating value = 1000 Btu per cu ft at 30-in. Hg — 60 F — Sat.

Ignore variations from ideal gas laws. Then from formula for factor F

$$F = \frac{[(2000 + 14.735) - 0.0]\ (60 + 459.7)}{(14.735 - 0.256)\ (60 + 459.7)} = 139.\ (\text{approx.})$$

Thus, the "as is" heating value per cubic foot in the certified cylinder under the assumed conditions is 139 times 1000 = 139,000 Btu.

Basis of Measurement

Data in Fig. 1 illustrates the importance of a clear definition of the cubic foot involved when talking about heating value. If the basis of measurement is not understood, the heating value might be assumed to be low by 2.37 percent or high by 6.93 percent in reference to the value corresponding to the standard cubic foot. (Variation of "F" in Fig. 1.)

Certainly, in the purchase and sale of gas, confusion on this point can be a very serious matter from a financial standpoint. In reporting statistics on the operation of a given company or the industry itself, significant variations can be introduced by failure to reduce the data to a common basis of measurement.

The problem of a uniform basis of measurement for the cubic foot for the gas industry seems to represent a field in which some work should be done. If a uniform standard were established, there would seem to be a considerable advantage in the accounting aspects of the industry.

Fig. 1. Factor to Apply to Heating Value Given in Btu Per Cubic Foot at Standard Conditions of 30-in. Mercury — 60 F Saturated to Give Results at a Special Base of Measurement.

Special base condition	Factor "F"	Percentage variation from standard conditions
14.4 psi — 60 F — Dry	0.9945	−0.55
14.65 psi — 60 F — Sat.	0.9941	−0.59
14.65 psi — 60 F — Dry	1.0118	+1.18
14.70 psi — 60 F — Dry	1.0153	+1.53
14.70 psi — 60 F — Sat.	0.9976	−2.24
14.80 psi — 60 F — Sat.	1.0045	+0.45
14.90 psi — 60 F — Sat.	1.0114	+1.14
14.90 psi — 60 F — Dry	1.0291	+2.91
14.95 psi — 60 F — Sat.	1.0148	+1.48
15.025 psi — 60 F — Dry	1.0377	+3.77
15.20 psi — 60 F — Sat.	1.0321	+3.21
29.3 in. Mercury — 60 F — Sat.	0.9763	−2.37
30.0 in. Mercury — 60 F — 15% Sat.	1.0151	+1.51
30.0 in. Mercury — 32 F — Sat.	1.0693	+6.93
30.0 in. Mercury — 60 F — Dry	1.0177	+1.77

Note: For above V_t at 32 F = 0.1804 in. Hg = 0.089 psi

V_t at 60 F = 0.522 in. Hg = 0.256 psi

30 in. Hg (32 F) = 14.735 psi

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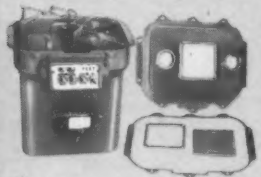

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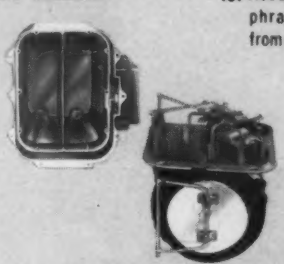

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Net Heating Value

The definitions previously given included one for net heating value. This term has occasionally caused confusion. From the definition, it can be seen that the net heating value is less than the total heating value by an amount of heat equal to the latent heat of vaporization, at the initial temperature of the gas and air, of the water formed by the combustion of the gas. Sometimes the term "lower" heating value is used to designate this quantity.

The difference between the two heating values depends only on the quantity of hydrogen in the gas, and the heat of vaporization of water.

Fig. 2 shows data on total and net heating value for some of the pure gases and certain fuel gases. A column is also included showing the value of R, which is the ratio of the net to total heating value. The variation in the value of R for the pure gases and for the commercial gases shown will be of significance when considering the performance of those instruments that more nearly measure net heating value, although calibrated to give results in total heating value.

Acknowledgment

This chapter on *Gas Calorimetry* has been prepared by C. W. Warner, Cutler-Hammer, Inc., Milwaukee, Wisconsin, adapted from a presentation made at the 1957 AGA Chemical, Engineering, and Production Conference.

Part 2 of this chapter will appear in the next issue.

Fig. 2. Heating Value of Gases.

Type of Gas	Composition Percent by Volume										Heating Value 30 in. Hg — 60 F — Sat.		
	H	CO	CH_4	C_2H_6	C_3H_8	C_9H_{10}	C_nH_{2n} (Ill.)	CO_2	N_2	O_2	Total	Net	R = Net÷Total
Hydrogen	100	—	—	—	—	—	—	—	—	—	319.3	269.7	0.845
Carbon monoxide	—	100	—	—	—	—	—	—	—	—	316.0	316.0	1.000
Methane	—	—	100	—	—	—	—	—	—	—	996.9	897.6	0.900
Ethane	—	—	—	100	—	—	—	—	—	—	1758	1608	0.915
Propane	—	—	—	—	100	—	—	—	—	—	2529	2327	0.916
N. Butane	—	—	—	—	—	100	—	—	—	—	3333	3076	0.923
Blast furnace	2.0	27.0	—	—	—	—	—	13.0	58.0	—	91.7	90.7	0.989
Producer	10.5	22.0	2.6	—	—	—	0.4	5.7	58.8	—	135	127.0	0.941
Blue water	51.8	43.4	—	—	—	—	—	3.5	1.3	—	302	276.5	0.916
Carb. water	35.0	33.0	11.0	—	—	—	10.0	3.5	6.9	0.6	550	509	0.926
Oil	13.5	2.9	53.1	—	—	—	17.9	2.6	9.6	0.4	1020	938	0.919
Natural	—	—	90.0	8.9	—	—	—	—	1.1	—	1055	951	0.901
Natural	—	—	78.6	10.3	—	—	—	9.7	1.4	—	965	871	0.903
Propane-air	—	—	—	—	21.7	—	—	—	61.9	16.4	550	504	0.916
Propane-air	—	—	—	—	53.4	—	—	—	46.3	10.3	1350	1239	0.916
Butane-air	—	—	—	—	15.0	—	—	—	67.1	17.9	550	507	0.923
Butane-air	—	—	—	—	43.5	—	—	—	44.6	11.9	1450	1338	0.923

How to Write a Readable Business Report

Management reading and writing time is saved when essential reports are written in a readable, fact-packed style

H. E. Carroll

● **Get to the Point.** Long-winded introductions waste executive time in reading and writing. Don't tell what you are going to report on — report on it. State your purpose quickly and concisely.

● **Picture Your Reader.** Who is going to read the report? What does he know about the subject? Does he have any preconceived ideas? Does he have a technical background of gas industry terms? Visualize your report reader and write directly to him.

● **Express . . . Don't Impress.** You wouldn't have the report to write if there was any doubt about your ability. You don't have to waste time trying to be impressive — you are. Write to express facts and ideas — not to impress top brass or employees.

● **Highlight Main Points.** Outline your report before writing. Select main ideas or facts. Highlight these main points in outline form as you write. Indent sub-topics and explain briefly as necessary.

● **Keep It Easy to Read.** Readable report writing follows five basic rules:

1. Well-known words
2. Personal references
3. Short sentences
4. Short paragraphs
5. Short reports

Following these five rules will make your report easy to write . . . easy to read.

● **Be Logical.** First things should come first. Follow through in a logical step-by-step order. Don't start with yesterday, jump to tomorrow, and then back to today. Use space or time progression to keep your business report on the track.

● **End Properly.** Don't leave any loose ends. A business report can end in these two ways:

1. Brief summary
2. Recommendation for action

When you have touched all bases in your report, you are through. Stop! ★ ★ ★

How to Give Orders Effectively

Ernest W. Fair

IT'S A REAL pleasure to do things for my boss.

That's the sort of expression every gas company executive likes to overhear one of his staff men telling another. He's always the executive, too, who is securing maximum results from his department. His department seldom has employee problems. This executive learned early in his career that there are definite *do's* and *don'ts* in making suggestions to employees.

We've talked this over with a number of such executives. The methods they use were given freely. We've incorporated them into the following list of time tested and proved steps any other gas company executive can use to secure the same worthwhile results in his own department.

● **Treat each as an individual.** This is the top recommendation of the experts. They point out that we cannot assume all employees are alike in their reactions to suggestions from the *boss*. Each man or woman has his or her own peculiarities.

This calls for a careful study of each employee and directing the specific suggestion to these individual traits. It takes only a moment or two, and it pays off in the assurance of positive reaction from each individual when the suggestion is made.

● **Avoid "Military Commands."** There was a day when the accepted method of passing suggestions to employees was in the manner of a top sergeant issuing his "suggestions" to the new rookie. That day is gone forever. The executive who still employs the military command system of giving suggestions to employees is usually the one with the least responsive department.

Today's effective employee handling procedures call for diplomatic treatment in every relation between the gas company executive and his staff. Presenting every suggestion along the same vein is required procedure if we wish maximum results at our jobs.

● **Outline it to yourself first.** Here is the suggestion that seems most difficult for the new executive to learn. Many oldtimers still have not acquired a thorough understanding of its importance.

We can hardly expect maximum results unless each suggestion is well thought out and carefully detailed. Doing so is our assurance that we have overlooked no important detail involved, that it is being presented clearly and concisely, and in such a manner that the possibility for misunderstanding by the employee is reduced to an absolute minimum.

● **Be positive — not negative!** This is an important point that is continuously emphasized by every expert in employee management. All emphasize the *Do* approach rather than the *Don't* direction.

It is always easier for an employee to go into immediate action on a suggestion when he is given the specific and detailed steps to follow and when he does not have to cope with *don'ts*.

The positive suggestion is not only always easier for an employee to follow, but direct action to implement it can be taken quicker and with surer results. In those cases where it is imperative that a suggestion be put into action immediately and without error, positive presentation is an assurance that such results will be obtained.

● **Key each suggestion to the employee reactions.** After any employee has been on a staff for a few weeks, that individual's thought processes should be known fairly well by the executive. It is important that they be understood. And, it is also important that the executive carefully study each employee's fixed reactions to suggestions from the boss. When the executive has acquired this knowledge, then he is in a position to carefully key each of his suggestions to the individual's personality. This not only makes certain that we have recognized the top qualities of that employee, but are putting them to maximum use in our department.

● **Make certain "background" is given.** Here is another big point mentioned by most successful gas company executives. They emphasize that one must always be certain an employee is given all of the necessary background to properly carry out each and every order given him.

One of the greatest points of resentment by employees against department heads is being given orders without details on how the assignment is to be handled. Executives too often assume that every employee already possesses such background information and that it is a waste of time to go over the ground again.

Such is not always the case and it is particularly so where the suggestion or idea embraces some new procedure or plan that has not as yet been used in the company organization. Even where the suggestion involves old procedures, such details may have been forgotten by the employee or he will have to

waste precious time in organizing them in order to carry out the suggestion he has received.

● **Make clear the reward that is to follow.** This suggestion does not mean that we should hold out a reward to every employee for carrying out the orders or suggestions he is given. Such a policy would be disastrous in any organization.

What our successful executives mean by this suggestion is that the employee should be acquainted with the results that will follow the successful completion of the suggestion. When we can see worthwhile results from the things we are about to undertake, we always enter into those tasks with a great deal more enthusiasm and interest than we do where no such goals or rewards can be seen for the extra effort needed to get the job done.

● **Be sure the "reason why" is understood.** One of the prerequisite qualities of the executive mind is to know exactly why every move is made. Too often it is assumed that the employee has the same ability. The latter is true only in the most unusual cases.

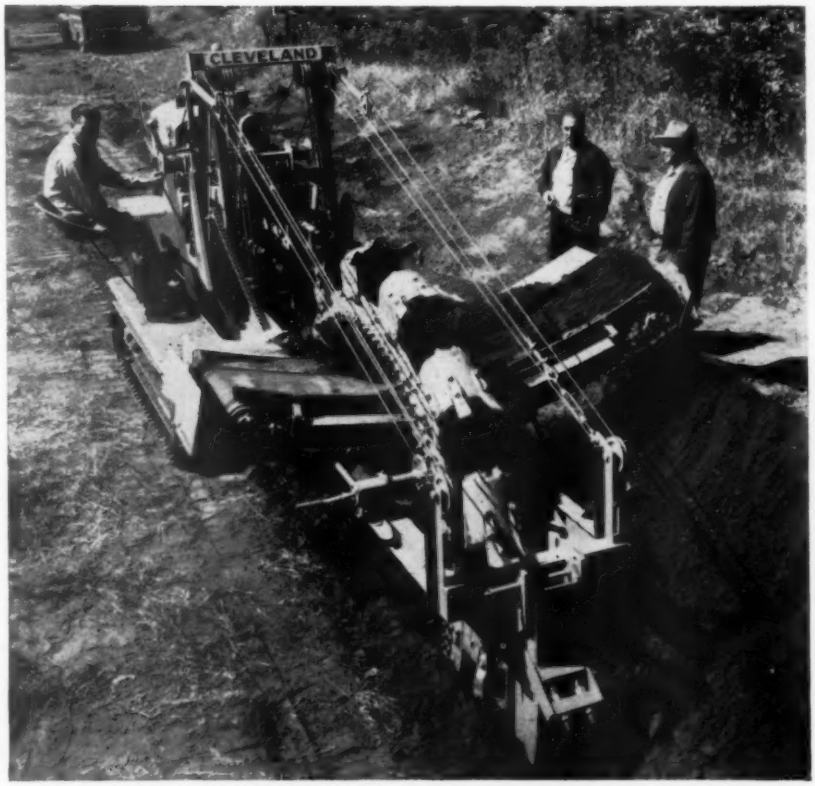
In very few instances are employees required to reason out factors involved in the things they do on their jobs. The mere fact that this is seldom required, tends to dull the employee's use of this valuable facility. We cannot expect that individual to automatically reason out every suggestion presented to him.

It takes little extra time for the executive to add brief explanations of the reasons behind the suggestion he is presenting to his staff. Doing so not only assures better reception of the idea by the employees, but also adds to their ability to carry such suggestions out satisfactorily. We all tend to do things better when we understand why the assignment has been given us.

● **If it's a correction, do it privately.** Where the suggestion involves correction or reprimand, it is always good executive diplomacy to take action privately with the individual involved. Even in cases where it is a minor matter, best employee reaction can always be assured when this procedure is followed, for no one likes to be corrected in front of others.

Each of the foregoing suggestions has been of positive help to a number of gas company executives. They can be applied with equal success by others. Application of the foregoing suggestions will also bring to light a number of other procedures which will be of assistance to any executive in his all important job of securing maximum reaction from the suggestions he gives as part of his job, to employees every day of the working week.

digs 'em and fills 'em with Clevelands



This gas company crew is putting a new Cleveland 110 through its paces. Like so many others who know Cleveland's fitness for utility distribution work, this Indiana company has standardized on Clevelands for more than 20 years.

Mains of the same Indiana company are backfilled—and simultaneously compacted—by the one-man-operated Cleveland 80W. It lays pipe, pulls crossings and does other side crane work, too.

THE CLEVELAND TRENCHER CO.

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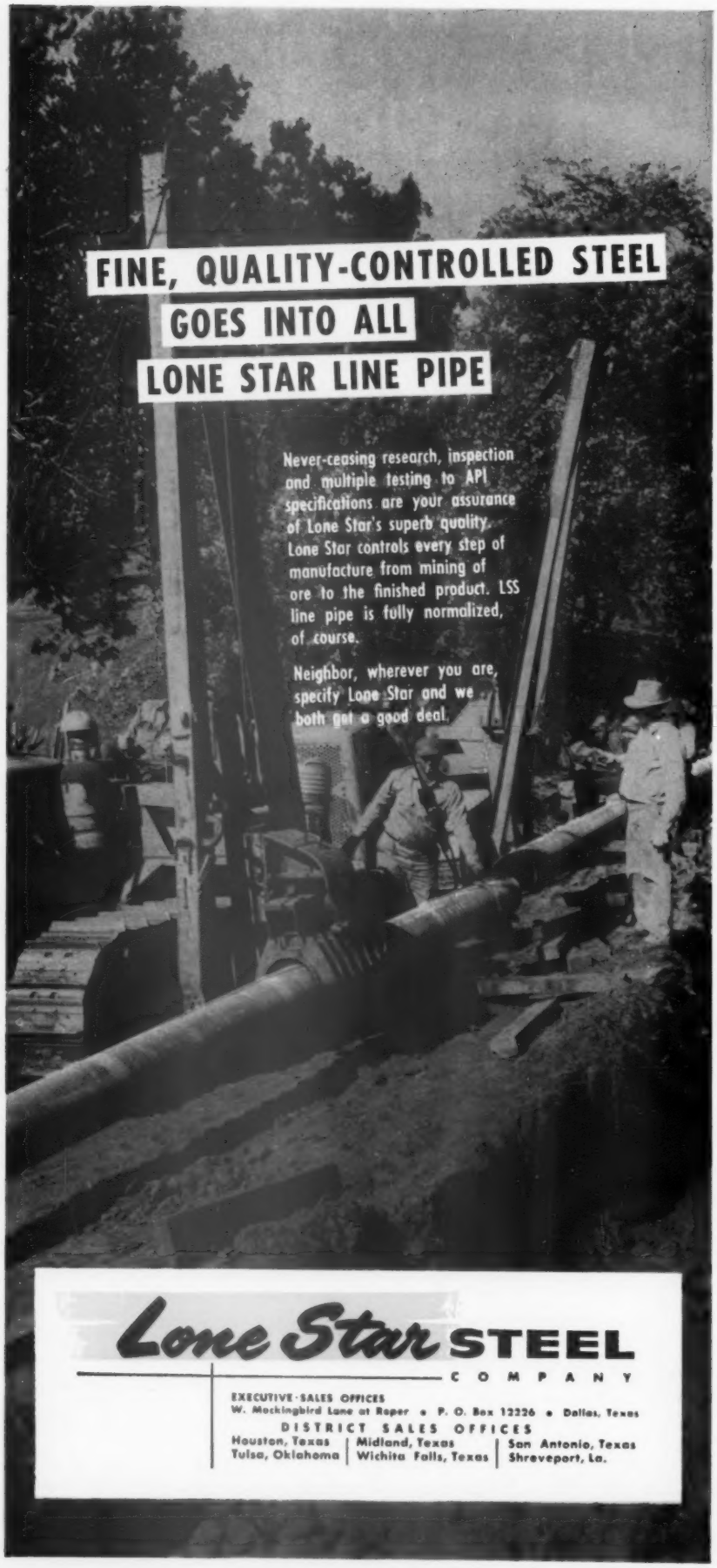
Good Everywhere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Never-ceasing research, inspection and multiple testing to API specifications are your assurance of Lone Star's superb quality. Lone Star controls every step of manufacture from mining of ore to the finished product. LSS line pipe is fully normalized, of course.
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Coming Events

IN THE GAS UTILITY INDUSTRY

November

1- 2 National Home Laundry Conference, Mayflower Hotel, Washington, D. C.

4- 8 National Metal Exposition, Chicago, Illinois. (AGA will exhibit.)

6 NEGA Operating Division, Hotel Statler, Hartford, Connecticut.

11-14 American Petroleum Institute, Conrad Hilton Hotel, Chicago, Illinois.

11-15 National Electrical Manufacturers Association, Traymore Hotel, Atlantic City, New Jersey.

11-15 National Hotel Exposition, Coliseum, New York. (AGA will exhibit.)

13-15 ASA eighth national conference on standards and thirty-ninth annual meeting, San Francisco, California.

14-16 The American Society of Refrigerating Engineers, semi-annual meeting, Shoreland Hotel, Chicago, Illinois.

16-18 Refrigeration and Air Conditioning Contractors Association, annual convention, Drake Hotel, Chicago, Illinois.

18-19 National Commercial Refrigerator Sales Association, annual convention, LaSalle Hotel, Chicago, Illinois.

18-21 10th exposition of air conditioning and refrigeration industry, International Amphitheatre, Chicago, Illinois.

18-22 National Warm Air Heating and Air Conditioning Association, Hotel Morrison, Chicago.

December

1- 6 ASME, annual meeting, Hotel Statler, New York.

2- 4 Institute of Appliance Manufacturers, Shoreham Hotel, Washington, D. C.

4 NEGA appliance servicing conference, Hotel Bancroft, Worcester Massachusetts.

January 1958

19 National Association of Home Builders Convention, Chicago, Illinois (AGA will exhibit.)

23 NEGA Operating Division, Hotel Statler, Boston, Massachusetts.

27-29 American Society of Heating and Air Conditioning Engineers, annual meeting, Pittsburgh, Pennsylvania.

30 NEGA, accounting division, Hotel Statler, Boston, Massachusetts.

February 1958

3- 7 Western Winter Radio-Television & Appliance Market, Western Merchandise Mart, San Francisco, California.

March 1958

17-21 National Association of Corrosion Engineers, San Francisco, California.

20-21 NEGA, annual meeting, Hotel Statler, Boston, Massachusetts.

24-26 Mid-West Gas Association, Broadmoor Hotel, Colorado Springs, Colorado.

27-28 Oklahoma Utilities Association, annual convention, Biltmore Hotel, Oklahoma City, Oklahoma.

31-April 2 GAMA, annual meeting, Greenbrier, White Sulphur Springs, West Virginia.

April 1958

8-10 AGA sales conference on industrial and commercial gas, Hotel Schroeder, Milwaukee, Wisconsin.

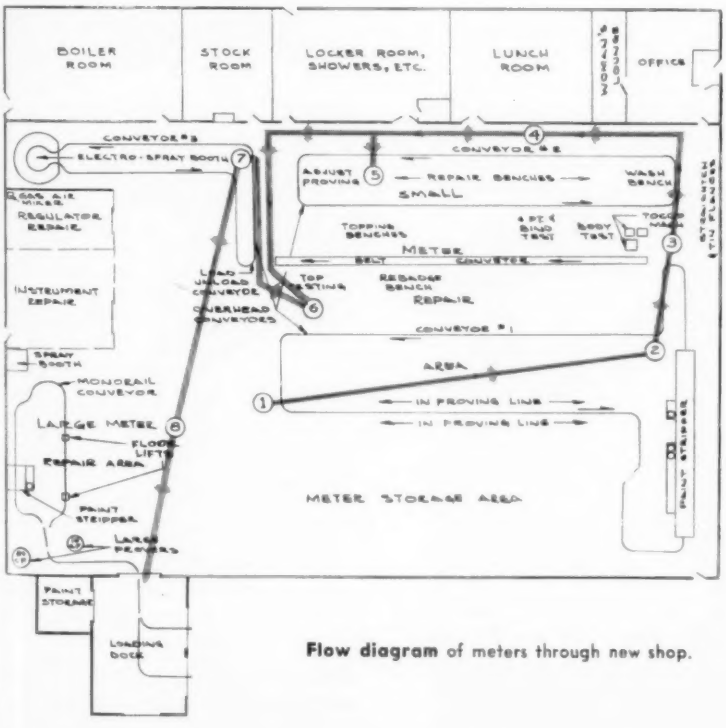
14-16 National Conference of Electric and Gas Utility Accountants, Shamrock Hilton Hotel, Houston, Texas.

Paint stripping unit in new meter shop. Hot caustic solution is sprayed on meters loosening paint. Hot rinse and dryer allows meters to emerge in about 10 minutes ready for inspection.

Conveyor system facilitates handling more than 100,000 meters annually. First stop for meter in new shop is this "in-proving" test.

MODERN AS TOMORROW . . .

Northern Illinois Opens New Meter Shop



Flow diagram of meters through new shop.

LATEST METHODS AND EQUIPMENT used to check, clean, repair, and adjust gas meters were displayed to its employees, customers, and the general public by Northern Illinois Gas Company in October during ceremonies opening its new $500,000 meter shop in LaGrange, Illinois.

The new 20,000 sq ft meter shop and office replaces outmoded quarters. Its construction was prompted by the steady increase in the number of customers in Northern Illinois Gas Company's 20-county territory the past few years that are expected to exceed 750,000 by 1965.

Considered one of the most modern in design, the new meter shop features a conveyor system to carry meters through various operations with a minimum of lost motion. Planned to meet future needs, the new shop will permit processing of over 175,000 meters annually.

Illinois Commerce Commission regulations require that all gas meters be shop checked at least once every 10 years, which means between 60,000 and 70,000 must be removed from customers' premises annually by Northern Illinois Gas at the present time. In addition, about 40,000 new meters purchased each year by the company are

For your convenience in filing, this page scored for easy removal

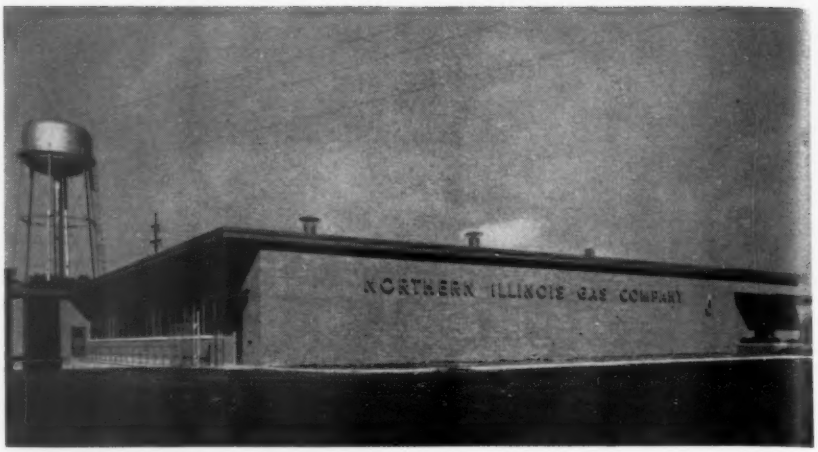
tested in the shop before being placed in service.

Meter Shop Data

Location. Located on an 11-acre site at 550 East Avenue (north of 47th Street and north of the gas holder) LaGrange, Illinois.

Size. 20,000 sq ft of which 16,000 sq ft is factory space and the balance houses the office, lunchroom, stock room, boiler room, and men and women's washrooms.

Construction. Brick veneer on concrete block with large window areas on the north and south sides.



Front view of Northern Illinois Gas Company's new meter shop in LaGrange. Loading dock is on left; main entrance to right.

Visitors at shop opening watch use of high frequency induction unit to melt solder on joint on top, permitting top plate to be removed in about 17 seconds. Meter is then placed on conveyor for final repair and test.

Other features. A loading dock with capacity of two trucks. Grounds are landscaped and fenced. Blacktop parking areas are provided. Building is completely gas air conditioned. Yard lighting is provided.

Air conditioning: 100 ton Carrier gas absorption type air conditioning equipment. Unit — (steam operated).

Steam supply. A 200 hp Pacific boiler fired by a Ray combination oil-gas burner supplies steam for air conditioner, heating and process.

Ultimate capacity of shop. Test and repair up to 175,000 meters per year.

Cost of building and equipment. Approximately $500,000. * * *

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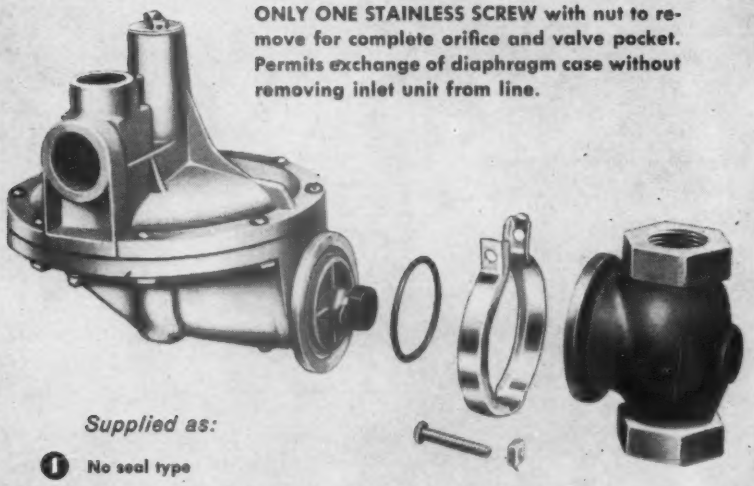
NRT-8010 SERIES
New House Service Regulator
NEW ALUMINUM BODY AND TOP
CAST IRON INLET UNIT
V-TYPE STAINLESS STEEL BAND

ONLY ONE STAINLESS SCREW with nut to remove for complete orifice and valve pocket. Permits exchange of diaphragm case without removing inlet unit from line.



Supplied as:

1. No seal type
2. No seal type with automatic cutoff
3. Internal diaphragm operated relief valve for complete over pressure protection
4. Internal diaphragm relief and automatic cutoff

REYNOLDS
REGULATOR CO.
ANDERSON, INDIANA

One enterprising Milwaukee gas appliance dealer took advantage of the Braves' rise to fame to boost his sales. Above is a view of a window at Pesick Radio & Appliance after the Braves won the National League championship and were well on their way to the 1957 World Series championship.

NEWS

ABOUT THE GAS UTILITY INDUSTRY

Southern California Gas Company has been awarded first place in the 1957 Public Relations Achievement competition of the American Gas Association. The 18-in. trophy conveying the progressive spirit and service character of the gas industry was presented Southern California Gas Company at the annual AGA convention in St. Louis. Judges selected Southern Cal's "Facts About Natural Gas" program as the year's "outstanding contribution to greater understanding of the gas industry and modern gas service."

In Two Minutes — Bond Redemption Prices. Commonwealth Services, Inc., which is assisting in the $35 million First Mortgage Bond issue of Consumers Power Company has arranged for The Service Bureau Corporation, a subsidiary of IBM, to compute special bond redemption prices in less than two minutes on its IBM 650 Data Process Machine. Manually, calculations with special redemption features require several man hours. Electronically, bid information phoned to The Service Bureau Corporation is punched into one card, inserted in the electronic computer, and prices developed in 1.2 minutes. Every hour saved in calculating redemption prices is especially valuable to the underwriter because the special redemption prices are printed in the prospectus which must be made available to the purchaser at the time bonds are offered for resale. Computing the prices electronically facilitates earlier SEC registration and marketing.

Rockwell Buys German Manufacturer. Rockwell has acquired ILO-WERKE, a leading West German manufacturer of two-cycle, air-cooled diesel and gasoline engines. The engines are used largely in industrial application to provide motive power for portable sprayers, construction equipment, concrete mixers, refrigeration, and air compressors. ILO-WERKE is Rockwell's first wholly-owned manufacturing subsidiary in Europe and the purchase represents an initial investment in excess of $2 million in cash.

Gas Industry Statistics . . . Automatic gas water heater shipments for the first six months of the year dipped from the all-time high reached last year at this time. Total this year was 1,336,500 units. . . . *Best safety record in the history of the gas utility and pipeline industry was achieved in 1956, the AGA's accident prevention committee disclosed in its annual report. This marked the ninth successive year in which the record was improved. All-time low figure of 8.68 disabling injuries per million manhours was established — compared with post-war peak of 21.86 in 1957 and the best previous mark of 10.17 posted in 1955* . . . **Consumption of gas by electric utility plants in the U. S. for the 12-month period ending August 31 amounted to 1,314,118,561 cu ft. This amount represents an increase of 9.2 percent compared with corresponding total for the 12 months ended August 31, 1956**. . . . Gas Heating Hits Seasonal Rise. All categories of gas-fueled equipment for residential central heating showed strong seasonal gains in August, but over-all shipment total remained below last year. August figures for furnaces, boilers, and conversion burners were the largest for any month in 1957.

Consumers' Gas Company has begun a $750,000 construction of a transmission line to serve the town of Lindsay, Ontario, Canada, with natural gas. About 30 miles in length, the transmission line will run from the Toronto-Montreal section of the Trans-Canada Pipe Line to Lindsay. Natural gas will be available this fall. Construction on the distribution system, estimated at over $600,000, is scheduled to begin shortly after work on the transmission line has started.

Southeast's First Line Pipe Mill. Aluminum Tubing Company has announced plans to install in Jacksonville, Florida, the Southeast's first line pipe mill for the manufacture of welded steel, stainless steel and aluminum pipe and tubing in the 4½ to 14-in. size range. Steel pipe will be welded by the electrical resistance welding process. Stainless steel and aluminum pipe will be welded by the inert-gas-shielded tungsten-arc and high frequency resistance welding processes. The company expects to be in commercial production on the new line pipe mill early in March 1958.

Third biennial Short Course on Cathodic Protection will be offered December 9 through 13 by the University of Illinois, Department of Electrical Engineering and the Division of University Extension, in cooperation with the NACE.

NJGA. Theodore H. Kendall, president, South Jersey Gas Company, has been named head of the New Jersey Gas Association at its 42nd annual meeting held in Spring Lake recently. Kendall, heading the utility which supplies natural gas to 2000 sq miles of South Jersey, also serves as a member of the board of directors of New Jersey Utilities Association.

Advertising Award Winner. Oklahoma Natural Gas Company has been named winner of the year's top award for public utility advertising in a contest sponsored by the Vincent Edwards and Company. The "Socrates" award is presented annually for outstanding utility advertising.

75 Students Attend First Gas Measurement Short Course Held at North Carolina State College. The students, representing eight different states, heard discussions of domestic, commercial, and industrial meters and regulators of gas installations. Group also covered maintenance and design of these installations. The newly-organized course was sponsored by the Southeastern Gas Association and conducted by the North Carolina State College Department of Chemical Engineering. Instructors for the two-day program included representatives from industry manufacturers, as well as staff members of the college's school of engineering.

Men At Work IN THE GAS UTILITY INDUSTRY

● **John L. Leisenring,** Chicago district sales engineer for Rockwell Manufacturing Company's Meter and Valve Division since 1948, has been promoted to assistant manager-gas products sales in Pittsburgh.

J. L. Leisenring

A. E. Wastie

● **Arthur E. Wastie** has been elected vice president in charge of engineering by Drake & Townsend, Inc.

● **Kenneth E. Anderson** has been appointed vice president of Norge Division, Borg-Warner Corporation, Chicago. He is general plant manager of Norge operations at Muskegon Heights, Michigan, and reports to **V. C. Rice,** vice president in charge of all Norge manufacturing and engineering. He will continue to be in charge of the refrigerator and home freezer, aircraft, and factory parts service plants.

● **G. J. Tankersley** has been elected president and a director of Western Kentucky Gas Company and its subsidiary. He was formerly executive vice president and a director of the Gas Light Company of Columbus, Georgia.

G. J. Tankersley

P. R. Kennedy

● **Paul R. Kennedy** has been appointed gas utility sales representative for Norge Division, Borg-Warner Corporation, with headquarters in Atlanta. He will be responsible for the development of Norge gas range, water heater, and automatic clothes dryer sales with utilities in the southern states. He was formerly with Servel.

● **Warren J. Meyer** of Westfield has been appointed chief engineer of H. Emerson Thomas and Associates, Inc. He replaces **Arthur E. Wastie** who resigned effective October 1.

● **Dr. Francis A. Smith,** a chemist in the gas chemistry section of the National Bureau of Standards, has retired after 32 years service. He had done extensive work in gas appliance design, gas density measurements, and infrared spectroscopy.

● Pacific Lighting Gas Supply Company has announced the following organizational changes: **J. H. N. Ellis,** formerly supervisor of gas storage has become acting superintendent of operations. **R. N. Talley,** superintendent of compressor stations, and **H. C. Vlasek,** supervisor of gas operations, will report directly to Ellis.

● **Frank Freer, Jr.,** has been appointed comptroller of the Public Service Electric and Gas Company replacing **F. Warren Cooper** who has retired on pension. **Lewis R. Fay** has been appointed to succeed Freer as assistant comptroller.

● **Harry S. Hahn,** who rose from meter reader to an assistant treasurer of the Ohio Fuel Gas Company, has retired after 40 years of service to the company.

H. S. Hahn

R. W. Ball

● **Robert W. Ball,** Rochester Gas & Electric Company, Rochester, has been named chairman of the 1957-58 Research committee for the National Office Management Association. The 17,000-member association of operating management executives seeks to improve management through the development and adoption of better office standards and techniques.

● American Meter Company has named two sales-service representatives — **Wilbur W. Lints** who will headquarter in Erie, Pennsylvania, and **Vernon C. Welsh** who has been named for the Wynnewood, Pennsylvania, sales district. **L. Raymond Sauve** and **Douglas M. Chilibeck** have been appointed new sales representatives for Canadian Meter Company, Ltd. Both men have recently completed American Meter's six month sales training course in Erie, Pennsylvania.

● Askania Regulator Company has named **W. G. Holzbock** as chief engineer. **James Kogen** assumes Holzbock's former position as chief development engineer.

● **L. S. Baldin, S. R. Fleming** and **W. O. Johnson** have been elected vice presidents of Ford, Bacon & Davis, engineers-constructors of New York effective October 1. Fleming has also been elected vice president of Ford, Bacon & Davis Canada, Ltd., a wholly-owned subsidiary.

● **William P. Glancy** has been appointed head of the payroll department of The Peoples Natural Gas Company of Pittsburgh.

W. P. Glancy

W. H. Ferriss

● **William H. Ferriss,** former advertising manager of Temco, Inc., has been appointed advertising manager of Magic Chef, Inc.

● **Charles V. Hoey** has been appointed employee relations director of the newly-created employee relations department and **Louis E. Boliver** personnel manager for The Peoples Natural Gas Company.

L. E. Boliver

D. V. Kniebes

● **Duane V. Kniebes,** a specialist in analysis instrumentation and computers, has been named assistant research director at the Institute of Gas Technology of Illinois Institute of Technology, Chicago.

C. S. O'Neil

Charles S. O'Neil, 53, vice president in charge of research, of the Hamilton Manufacturing Company of Two Rivers, died August 27.

Bernard C. Cobb

Bernard C. Cobb, 87, pioneer and leader in the development of electric, gas, and transportation utility companies and one-time chairman of The Commonwealth & Southern Corporation, died September 30 at Altamont, New York.

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Cubic feet of gas per hour	10 to 500M
Pipe diameters	¾-in. to 48-in.
Pressure loss (inches)	.01 to 50
Specific gravities	.35 to 1.5
Constants	1000 to 1400
Pipe length (feet)	30 to 30,000

For HIGH Pressures

Cubic feet of gas per hour	100 to 10,000M
Pipe diameters	¾-in. to 30-in.
Difference in absolute pressure to	500 psi.
Sum of absolute pressures	20 to 2,000 psi.
Specific gravities	.35 to 1.5
Pipe length (feet)	100 to 5,000
Pipe lengths (miles)	1 to 250

The computers are printed on heavy durable plastic, enclosed in Fabrikoid cases with complete instructions for their use.

PRICE: $7.50 EACH

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AMERICAN GAS JOURNAL

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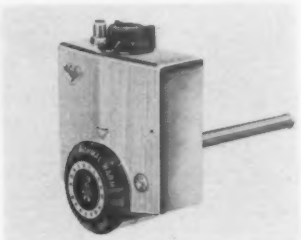
NEW EQUIPMENT
OF THE GAS UTILITY INDUSTRY

For more information on items described here in brief, use the handy reply card and circle the corresponding numbers

Thew Shovel Front End Loader. Production of the first model of a new line of rubber-tired front end loaders has been announced by Thew Shovel Company.

Named Moto-Loader, the first model of the new line is a 4-wheel drive, 1¾ yd capacity unit, designated Model ML-153. Available with either gasoline or diesel power, unit utilizes an Allison "Torqmatic," 3-speed, power-shifted, full reversing transmission and integral torque converter with a 2.5 to 1 ratio. Top speed is 21.4 mph. Use of the integral torque converter provides infinite number of "gear" ratios in each speed range. Entirely new concept for travel direction selection and throttle control is introduced on the new Moto-Loader. Two adjacent foot pedals — one for forward travel and one for reverse — give the operator instant direction control, with one foot, while the other foot is used for braking. This frees both hands for steering and hoist and bucket controls. Another feature is automatic disengagement of transmission when foot controlled service brakes are applied. When brakes are released, transmission automatically returns to the gear range in which the loader has been working. This permits exact inching of the load and eliminates excessive strain and wear on the drive line components. *The Thew Shovel Co.*

CIRCLE (16) ON THE REPLY CARD



Unitrol 400. Robertshaw-Fulton has made several design improvements in its Unitrol 400, deluxe three-in-one control for gas-fired water heaters. Distinctive high-style appearance has been achieved by changing the ribbing on the control's silver cover plate to extremely thin-line corrugations. Unitrol's large temperature control knob is now sloped at an angle so that temperature settings are readily visible from a standing position when control is mounted at the base of the water heater. Both temperature knob and automatic pilot switch are in black plastic. Gold lettering further highlights the operating instruction. Another improvement, operation of the temperature knob was changed so that it remains flush with the cover plate as it turns. Henry Keck Associates of Pasadena was design consultant. *Grayson Controls Division, Robertshaw-Fulton Controls Company.*

CIRCLE (17) ON THE REPLY CARD

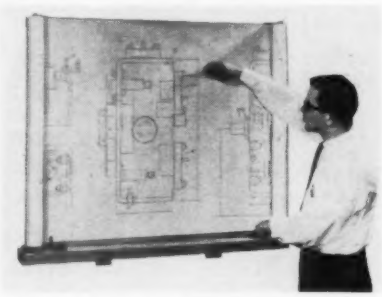
Thread Sealing Compound. New thread-sealing compound, Rectorseal No. 5, that dries slow and sets soft has recently been perfected to complement Rectorseal No. 2 which is fast-dry. New compound is particularly suited for assembly line connection work since it will not dry in the open can; and will not harden with age under recommended service conditions. Plastic elasticity of Rectorseal No. 5 allows joint to be broken easily at any time without damage to threads. Contains no lead or other metals. Extended field tests show it is excellent for piping connections carrying air, natural gas, manufactured gas, steam, propane, butane, and other similar substances. Compound is now available in ¼, ½, and 1-pint brush top cans and 1-quart friction top cans. *Rectorseal Division.*

CIRCLE (18) ON THE REPLY CARD

Gas Appliance Controls. Complete line of gas appliance controls has been developed by A-P Controls to provide a range of Btu capacities for all types of gas equipment. Line includes four models: 55, 5010, 5030, and 5250. Smallest control, the Oven Tender (Model 5030) is approximately the size of a playing card and is designed for automatic gas ranges with clock controlled ovens. Normally open, the electromagnetic control is energized by the oven clock. Unit mounts and operates in any position and is easily adaptable to any range. Tab and screw terminal leads are optional. *A-P Controls Company of America.*

CIRCLE (19) ON THE REPLY CARD

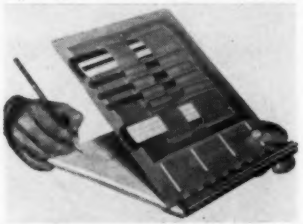
Viewer for Long Prints. New, convenient, space-saving long-print holder for viewing blueprints, drawings, photos, maps, etc., up to 40 ft or more in length in an area of approximately 40 by 48 in. on wall,



table, desk, or station wagon tailgate is now available. Called the ROLL-O-PRINT Long-Print Viewer, device is constructed of sturdy satin-finished aluminum and heavy black plastic, and is available in two different models. Model "A" can be secured to wall with screws and two brackets, or mounted on any flat surface with clamps. Model "B" clamps on horizontal surfaces of any length such as on desks, tables or benches and features a rolling device to move prints. *Aqua Sportsman, Inc.*

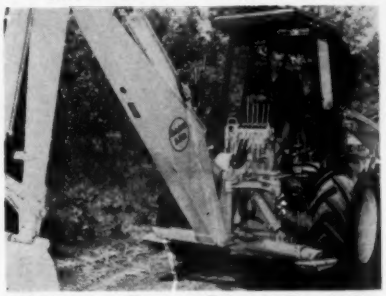
CIRCLE (20) ON THE REPLY CARD

Aluminum Sheet Holder. Stratex Instrument Company has devised a new aluminum holder to aid field men. Fabricated of non-magnetic, satin-finished alloy with snap-spring covers to eliminate pressure



tapes, clips, and thumb tacks, each holder has a heavy mildew-resistant cowhide pencil and scale pouch flush-riveted to the lid. Cowhide pouch in popular sizes is molded and compartmented to accept two standard pocket scales and four pencils of varying hardness or color. Device is particularly applicable for note taking or map reading in confined spaces because molded leather compartments tend to clutch and retain pencils and scales not being used. Popular size holder is built to accommodate multiples of 8½ by 11 standard sheet size for notes, graph paper, maps and charts, but is available in a variety of sizes. Small triangles, protractors, and similar tools are securely gripped by the spring cover if desired and carried integrally with the protected documents. *Stratex Instrument Company, Inc.*

CIRCLE (21) ON THE REPLY CARD



All-Weather Tractor Cabs. J. Frank Sims Cab Company has recently announced manufacture of a sturdy all-weather cab for use on International, Ford, Fordson Major, Case, Minneapolis-Moline, John Deere, and Oliver tractors. Cabs are designed to fit either bare tractor, or tractors equipped with most combinations of front and rear-mounted equipment, such as loaders, backhoes, dozers, brooms, snow plows, post hole diggers, mowers, scrapers, cranes, or trenchers. Operating controls may be mounted inside cab to allow full use of tractor in all weather, the year around. Cab fits tightly to the tractor, providing warm, windproof comfort for the operator in cold weather. Unit allows complete visibility in all directions, including upward through the large safety glass windshield and sky-light. Frame is constructed of rugged 12 and 14 gage steel and mounted to withstand vibrations and hard usage. Side panels, that may be either rolled up or snapped off in warm weather, are of sturdy fire, water, and mildew resistant canvas with heavy-duty vinyl plastic windows. *J. Frank Sims Cab Company.*

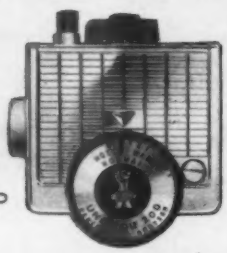
CIRCLE (22) ON THE REPLY CARD

the word is really getting around!

REPLACEMENT OR REFUND OF MONEY
Guaranteed by Good Housekeeping
IF NOT AS ADVERTISED THEREIN

UNITROL 400

ROBERTSHAW-GRAYSON WATER HEATER CONTROLS now feature the GOOD HOUSEKEEPING GUARANTY SEAL!



UNITROL 200

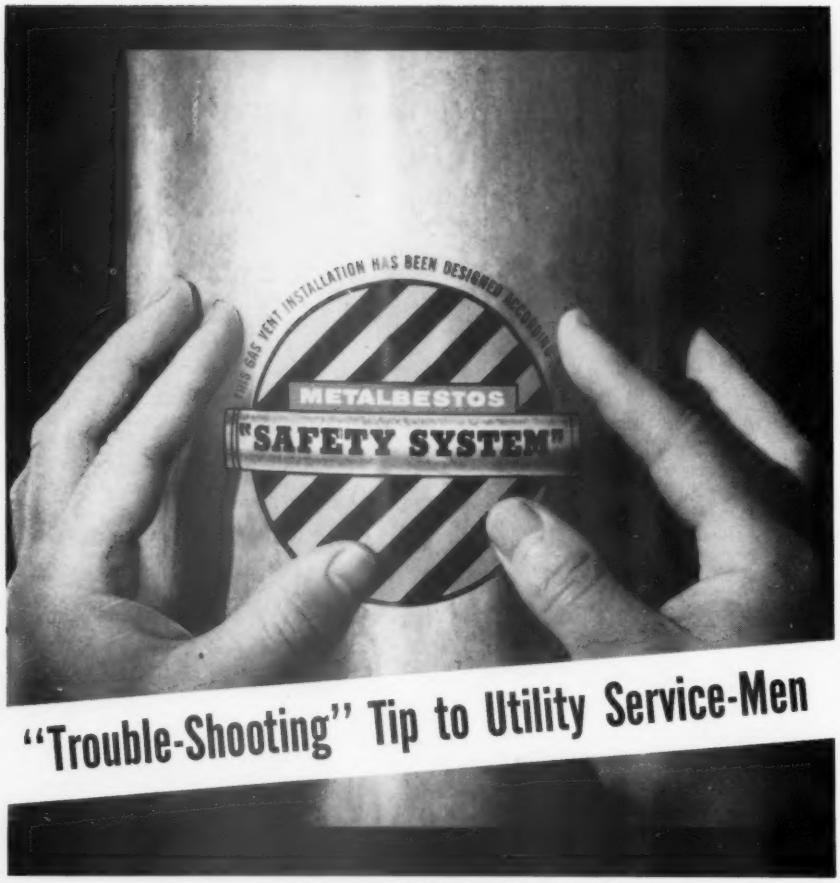
UNITROL 110

Here's important news for your water heater customers... the Good Housekeeping Guaranty Seal on ROBERTSHAW-GRAYSON water heater controls! What buyer doesn't recognize this value immediately? Next month, ROBERTSHAW-GRAYSON will announce their new promotion with a colorful full page advertisement in Good Housekeeping magazine... read by more than 10½ million homemakers all over America. ROBERTSHAW-GRAYSON controls on the water heaters you sell will give them a great new mark of distinction.

Specify Robertshaw-Grayson Unitrols Today!

Robertshaw-Fulton CONTROLS COMPANY

GRAYSON CONTROLS DIVISION • LONG BEACH, CALIFORNIA



"Trouble-Shooting" Tip to Utility Service-Men

When a gas-vent installer places the red-and-black Metalbestos "Safety System" Seal above an appliance's draft hood, he's helping the service-man locate any future gas installation trouble . . . by telling him it's *not* in the gas vent. That's because the Safety Seal means an all-Metalbestos gas vent, designed and installed according to the Metalbestos "Safety System" Gas Vent Tables.

The Metalbestos "Safety Seal" stands for scientific, quality gas venting . . . free from unhealthy spillage at the draft hood and corrosive condensation within the vent. Learn to look for the Metalbestos "Safety Seal" and promote its use. It's good for your business . . . good for gas.

For complete information on the new Metalbestos "Safety System," write Dept. AA-11.

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WILLIAM WALLACE COMPANY · BELMONT, CALIF.

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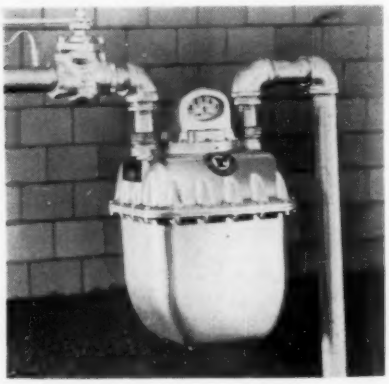
New Equipment

Wain-Roy Backhoe. New model WR-350 backhoe, for mounting on International-Harvester 300-350 utility tractors, has been announced by Wain-Roy Corporation. Increased speed and power, plus greater loading height, enables new back-

hoe to handle wider variety of difficult trenching jobs, bell holes, foundation excavations, utility trenches, service lines, etc. Digging range of 190 deg, digging depth of 12 ft below grade, and loading height of 9 ft combine to make backhoe a flexible, versatile attachment engineered to operate profitably under cramped conditions. Unique link-lever swing system provides smooth cushioned swing. Husky subframe provides sturdy mounting for backhoe, loader, dozer blade, mower and other attachments. Hoe is complete self-contained unit and can be quickly attached or detached — 4-pin mounting, 2 hose connections. *Wain-Roy Corporation.*

CIRCLE (23) ON THE REPLY CARD

Light-Weight Meter for Low-Pressure Services. New light-weight, single-joint aluminum gas meter designed primarily for commercial and industrial services requiring large capacity at low working



pressure has been introduced by Rockwell. Designated the 750, new meter weighs only 47 lb — about half the weight of other meters of its capacity — and is easily carried and installed by one man. Its 15-psi working pressure and capacity of 750 cu ft per hour at ½-in. differential and 1600 cu ft at 2-in. differential make it ideal for restaurant, hotel, and other commercial and small industrial installations. Meter is available with either 45 light steel spud connection or 1½-in. pipe tap connection. Meter features side-guided, gear-driven valves for smooth performance. With exception of body top cover, index plate, and nuts and bolts, parts are interchangeable with Rockwell's 1600 meter. *Meter and Valve Division, Rockwell Manufacturing Company.*

CIRCLE (24) ON THE REPLY CARD

Things to write for . . .

Bulletins, brochures, books of interest to gas utility industry people

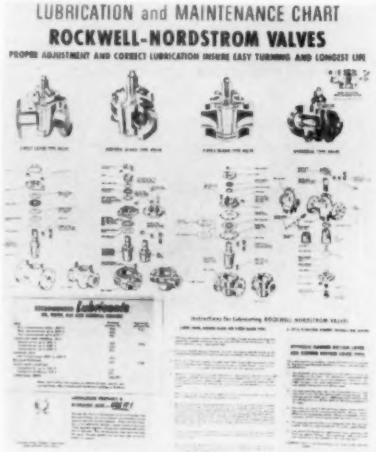
Rotary Compressors. New bulletin, showing component parts of new Hydrovane Rotary Compressors, is now available from Davey Compressor Company. Illustrations include cut-away photos taken from directly below the unit and sectional views of each side. Compressor feature stressed is its accessibility for inspection or repair. Davey Compressors have 50 percent fewer working parts than other machines. Oil separators, segmented rotor vanes, control panels, and the engine speed control are among components shown. *Davey Compressor Company.*

CIRCLE (73) ON THE REPLY CARD

GAMA Incinerator Manual. A 12-page manual of recommended practices for installation of domestic gas-fired incinerators has been reprinted by the incinerator division of Gas Appliance Manufacturers Association. Produced by the division's technical committee, the manual gives detailed instructions, with diagrams, covering installation of gas incinerators, gas piping, flues, and vents. Also included are instructions on incinerator operation and maintenance. *$.15 a copy. Gas Appliance Manufacturers Association.*

CIRCLE (74) ON THE REPLY CARD

Valve Maintenance and Lubrication Chart. New 19 by 24-in. three-color chart containing maintenance and lubrication information for Rockwell-Nordstrom lubricated plug valves has been issued by


LUBRICATION and MAINTENANCE CHART
ROCKWELL-NORDSTROM VALVES
PROPER ADJUSTMENT AND CORRECT LUBRICATION INSURE EASY TURNING AND LONGEST LIFE

Rockwell Manufacturing Company. Made of heavy paper and equipped with metal edges, chart is suitable for display on shop, engineering, and maintenance office walls. It features detailed exploded views of four types of Rockwell-Nordstrom valves — two-bolt cover, screwed gland, three bolt, and Hypreseal. Table of recommended lubricants for oil, water, gas, and chemical service, as well as complete instructions covering valve servicing are included. *Meter and Valve Division, Rockwell Manufacturing Company.*

CIRCLE (75) ON THE REPLY CARD

Pipe Joining. Illustrated bulletin describing the "Vic-Easy" method of joining thin wall steel and aluminum pipe and tubing is now available from the Victaulic Company of America. Newly developed method provides positive, leak-tight connections by means of quick couplings assembled on grooves precision-rolled in the ends of the tubing. System provides speed and ease in assembly, and savings from lower initial cost and transportation cost of light weight tubing. Details of the system and applications for which the method is suitable, are listed. Three different couplings and their uses are detailed. One, the snap-joint coupling, can be installed without the use of tools. The other two, for heavy duty work or for low pressure, low external stress applications, can be installed by use of only one wrench. Bulletin indicates how "Vic-Easy" method effects economies by permitting selection of pipe wall thicknesses closely matched to the specific requirements of a job. *Victaulic Company of America.*

CIRCLE (76) ON THE REPLY CARD

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Install MAYCO Nylon Insulated Dielectric Fittings. They give positive protection, inexpensive enough for every job. Proven by the millions — able to withstand 230° F. and pressures up to 1000 lbs. Ask your jobber or write direct to us.

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1. The names and addresses of the publisher, editor, and business managers are:

Publisher: The Petroleum Engineer Publishing Company, 800 Davis Bldg., Dallas, Texas.

Editor: Dean Hale, 800 Davis Bldg., Dallas, Texas.

Business Manager: Joe B. Woods, 800 Davis Bldg., Dallas, Texas.

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Joe B. Woods, Business Manager.

Sworn to and subscribed before me this 30th day of September, 1957.

(Seal) Lillian H. Johnston
Notary Public, Dallas County.
(My commission expires June 1, 1959.)

1897 1957

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Hundreds of gas distribution firms have materially improved their safety factor and substantially reduced "unaccounted-for" by employing SOUTHERN CROSS FORESTERS to locate and repair their street leakage.

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Index to ADVERTISERS

American Liquid Gas Company 44
American Meter Company . . . . . Front Cover, 23
American Telephone & Telegraph . . . . . —
Aqua Survey Corp.
Catskill Craftsmen, Inc. . . . . —
Chaplin-Fulton Manufacturing Company . . . . . Inside Back Cover
Cleveland Trencher Company 39
Connelly, Inc. . . . . —
Dresser Industries, Inc. 8
Dresser Manufacturing Division 8
Fish Companies, The . . . . . Inside Front Cover
Fisher Governor Company 26-27
Gas Equipment Manufacturers . . —
Gas Purifying Materials Company . . . . . —
Greenlee Tool Company . . . . . —
H & M Pipe Beveling Machine Company . . . . . —
Heath Survey Consultants, Inc. . . . —
Hydrauger Corporation, Ltd. . . . . —
Joslyn Manufacturing & Supply Company . . . . . —
Lancaster Meter Parts . . . . . —
Lone Star Steel Company 40
McCabe-Powers Auto Body Company . . . . . —
May Company 50
Midwestern Pipeline Products Co. —
Moonglow Gas Light Co. . . . . —
Mueller Co. 5, 6-7
Norton-McMurray Mfg. Co. . . . —
Oronite Chemical Company . . —
Pittsburgh Coke & Chemical Co. . —
Reynolds Gas Regulator Company 42
Rheem Manufacturing Company —
Robertshaw-Fulton Controls Company 47
Rockwell Manufacturing Company 9-10
Royston Laboratories . . . . . —
Safety Gas Main Stopper Co., Inc. 50
Sheehan Pipe Line Constructors . . . —
Sherman Products, Inc. . . . . —
Skinner, M. B., Co. 1
Somerville Construction . . . . . —
Southern Cross Foresters 50
Sprague Meter Company . . . . . Back Cover
Standard Pipeprotection, Inc. . . . —
Superior Meter Company 35
Tapecoat Company, The . . . . . —
United Engineers & Constructors, Inc . . . . . —
Wilkinson Products Company . . . . —
William Wallace Company 48

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New Literature

Special Blast Cleaning Machines. Cleaning and finishing problems frequently require specially designed and constructed machines for their solutions. Wheelabrator engineering and research has issued a new 34-page brochure, "Special Cleaning Problems Solved," that shows by photographs and schematic drawings how airless blast cleaning, air blast cleaning, and wet blast cleaning have been employed in specific applications. Short case histories relate experiences of more than 50 companies in producing a better product, faster, more economically, and more efficiently. Also described is the Wheelabrator engineering demonstration laboratory where more than 700 tests are performed each year. Laboratory is equipped with 13 of the most modern blast cleaning machines available. *Wheelabrator Corporation.*

CIRCLE (77) ON THE REPLY CARD

Construction Equipment Bulletin. New eight-page bulletin, CG-15, describing and illustrating products manufactured for construction use, is now available from Le Roi Division. Catalog includes photographs and specifications of Le Roi's complete line of portable air compressors, both reciprocating and rotary; of the Tractair, a combination compressor-tractor, and attachments; of Newmatic air tools, including breakers, drills, tampers, and spades; and of CRD one-use drill bits. Twenty-two photographs, many of construction scene, are used to illustrate the products. *Le Roi Division, Westinghouse Air Brake Company.*

CIRCLE (78) ON THE REPLY CARD

"Packaged" Power for Mobile Installations. How 2 horsepower can do the job of 160 horsepower — for keeping truck radio batteries charged, is described and illustrated in Onan's new "Mobile Installations" folder, Form F-111. Well illustrated, the 8-page folder describes three Onan "packaged" power systems — each specifically engineered to provide dependable low-cost electric power for all users of mobile communications equipment. Brochure points out the heavy drain on vehicle batteries when mobile radios are used and truck engine is not running, and tells in detail how Onan's 2 hp engine-driven electric plants do the job of the 160-hp truck engine with resultant savings in gasoline and truck engine maintenance. Three systems are described in the folder: Battery charging with a-c power; high battery charging output, and battery charging only. Specific Onan plants are recommended and an easy-to-follow chart cites uses and advantages of each system. *D. W. Onan & Sons, Inc.*

CIRCLE (79) ON THE REPLY CARD

Pipe Coating Plant Brochure. An eight-page, four-color brochure is now available that describes the Southern Pipe Coating Company's facilities for cleaning, coating, and wrapping pipe in all sizes from ¾- to 12-in. in its new Atlanta plant. Drawings illustrate various stages in wrapping process, and a description is given of the holiday detection test and other controls which assure pipe is evenly coated, and completely protected. Sketch shows company's 17-acre yard for storage of bare and coated pipe. In-transit privileges and the company's fleet of trucks for delivery anywhere in the Southeast are also described. *Southern Pipe Coating Company.*

CIRCLE (80) ON THE REPLY CARD

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	39	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	39	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120

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gives widest range control... no other like it!

- Ready for installation . . . no field connections needed
- All-steel construction . . . stainless steel trim
- Pilot loaded for accurate control
- Large capacities 529,000 cfh at 800 psi inlet

Single seat valve with molded in place disc—balanced against inlet pressure thrust.

Size—2" flanged Series 60 (Series 30 Optional)

Working Pressure—1200 psi (Series 30-600 psi)

Outlet Pressure

With Type 51 Pilot	50-150 psi
Type 52 Pilot	50-300 psi
Type 53 Pilot	50-600 psi

Face-to-Face

Series 60	10½"
Series 30	9¾"

for complete information write for bulletin 1200

You could look high and low and not find another gas regulator like this Model 1200 in the business. It's compact and self-contained, designed for rugged high-pressure service with Chaplin-Fulton accuracy. No field connections needed—a 2" integral unit ready for installation. Actually, this Model 1200 is an all-steel version of our widely accepted Model 1100 . . . now ready to help solve your high-pressure problems.

ACCURATE CF MFG CO DEPENDABLE

WSW 6834

Chaplin-Fulton

MANUFACTURING COMPANY

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STANDARD DOMESTIC
METER

Those who know demand the best. For gas distribution systems there is no finer equipment than that produced by Sprague. The Sprague 175 Standard Domestic meter is but one of a line of meters with an exceptional reputation for accuracy maintained over long service periods. The design simplicity inherent in all Sprague Gas Meters assures extended service life with a proven record of low upkeep costs.

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